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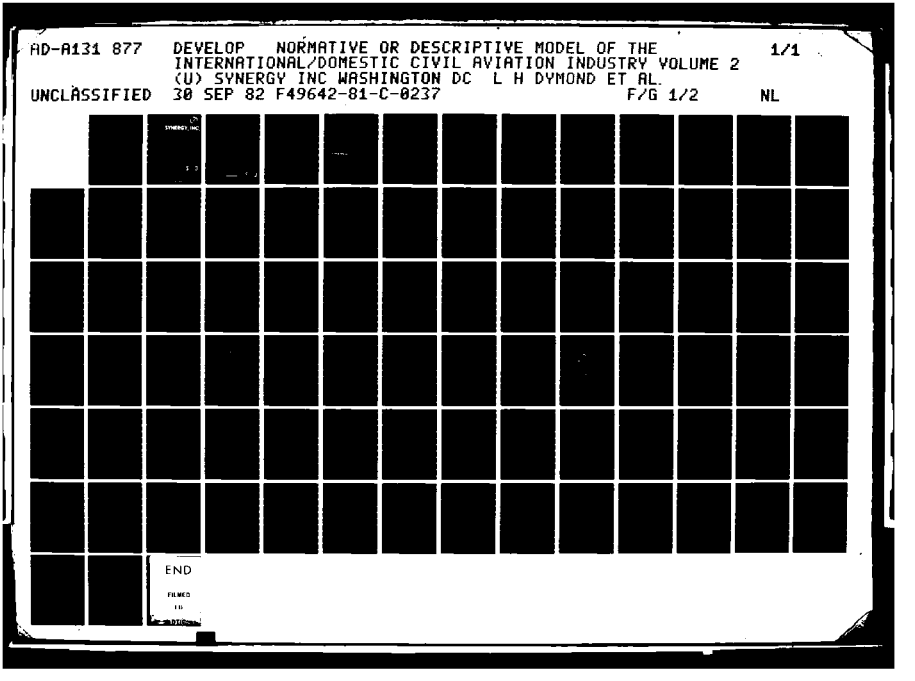

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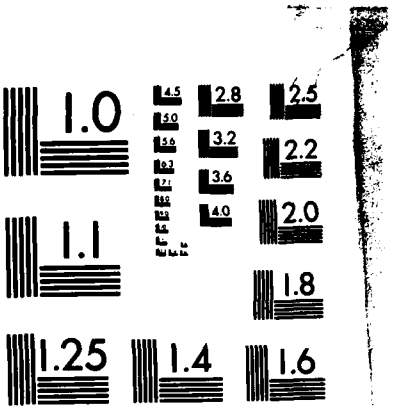

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SYNERGY, INC.

LETX/Synergy, Inc.
DEVELOP A NORMATIVE OR DESCRIPTIVE
MODEL OF THE INTERNATIONAL/DOMESTIC
CIVIL AVIATION INDUSTRY

Volume 2

Final Report

2337 18th Street, NW
Washington, DC 20009

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LETX/Synergy, Inc.

DEVELOP A NORMATIVE OR DESCRIPTIVE MODEL OF THE INTERNATIONAL/DOMESTIC CIVIL AVIATION INDUSTRY

Volume 2

Final Report

September 30, 1982

Submitted to:

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September 30, 1982

Develop a Normative or Descriptive Model of the International/Domestic Civil Aviation Industry

Volume 2

Final Report

The final report is a compilation of Increments 1, 2, 3, and 4 with accompanying cover, table of contents, diagrams/drawings, and bibliographic data/sources.

SYNERGY, INC.

WORKING DRAFT

TITLE: Final Report, Volume 2

AUTHOR(S): Lee H. Dymond, Debrah L. Denemark, and Karl E. Olsoni

DATE: September 30, 1982

This Working Draft is intended to transmit preliminary results of Synergy, Inc. research. It is unreviewed and unedited. Views or conclusions expressed herein are tentative and do not necessarily represent the policies or opinions of the sponsor.

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CONTENTS (continued)

CONTENTS (continued)

I. INTRODUCTION

Volume 2 of this report provides a detailed overview of the U.S. civil aviation industry, focusing on the immediate term and the future. Its purpose is to provide a foundation for identifying the implications of the projected future aircraft fleet mix on the civil/military airlift system into the 1990 time period. The project is a direct result of the current turbulence in the airline industry and the uncertainty of the future airlift system. The results of the study provide a foundation to support the development of an analytical/modeling system for the Air Staff to project alternative future configurations of the civil air fleet given alternative scenarios of future conditions in the industry. The end result of the effort will serve planning purposes for the CRAF and CRAF enhancement program.

This particular phase of the effort focuses on four areas, including:

- The regulatory framework existing in the industry and that projected to exist in the future;
- The association network that has developed for the civil aviation industry and its importance to the development of future air industry structure;
- The components of the industry itself, including the number and types of airframes, engines, support functions within the industry such as travel agents, air freight forwarders, etc.;
- The industry demographics, including operating behavior, route competition, fares, etc.

An evaluation of these factors is presented below, in an integrated fashion, so that the reader can understand the interrelationships that exist between these different aspects of the airline industry. In some instances, the linkage that exists between different aspects of the industry is temuous, and in other instances those links are very strong. It is not the purpose here to judge the effectiveness of those interrelationships. Instead, this

report serves only as a description of the industry, to provide the correct foundation for the modeling exercises that follow. In addition, it will become clear to the reader that certain descriptive factors are more important than others, as a result of current economic conditions and the general environment in the airline industry. It is natural that the report focus on these most important factors, at the expense of other, less significant variables. This report by necessity excludes certain factors affecting conditions in the airline industry. It is hoped that the excluded factors are of least importance and do not directly affect the modeling phase of this project.

This report is not meant to be a comprehensive analysis of the entire U.S. civil aviation industry. Rather, it is a descriptive analysis of those factors that are most important to projecting the future civilian fleet mix. Of particular interest is the future availability of passenger and especially cargo aircraft capable of traveling overseas and handling large loads.

The major purpose of the CRAF program is to supplement military airlift by supporting the Military Airlift Command (MAC) in times of national emergency. Presently, there is sufficient capacity to meet most demands for moving personnel. However, the total cargo capability, especially for outsized cargo (i.e., too large for a C-141), may not be adequate to meet certain future contingencies.

There are certain requirements about aircraft size and range of flight that must be met. This study will focus on wide-body aircraft with a range of 3,000-3,500 nautical miles, including long-range wide-body aircraft and some medium-range wide-body aircraft. The study will concentrate on prospects for their continued development and expansion (or contraction) within the overall

civil air fleet.

All studies have certain limitations, and this report is no exception. Data are reasonably current and thus provide a good operating and financial description of the industry in an historical context. However, other factors such as the nature of the deregulated environment, general economic trends, fluctuations in fuel prices, and the development of alternative patterns of route structure raise considerable uncertainty about the future evolution of the civil airline industry. The concern is primarily over the size and shape of the industry that will emerge from the interaction of these factors. This report does not present arguments pro and con on the merits of deregulation, projected future fuel prices, future competition, etc. of route competiton. These topics are current and are constantly being evaluated by experts within and outside the industry, and little could be added to those debates here. Instead, this report is intended to be descriptive of what has gone on in the past, what is current, and what is likely to occur in the future, based on the judgments of industry experts, government officials, and independent observers and analysts. However, current, swift changes occurring in the airline industry cloud our understanding of the airlines' immediate future and cause the analysis here to be suggestive rather than indicative of the future of the industry.

Volume 2 is composed of four major sections that provide the bulk of the analysis. The first section deals with the regulatory framework, followed by a section dealing with the association framework, and a third section that deals with the industry components and demographics. The fourth section addresses the financial performance of the industry. All of the sections are supported in more detail by appendices, which are included in Volume 3.

II. REGULATORY FRAMEWORK[1]

A. Air Regulation

The federal role in fostering and regulating civil aviation began in the year 1926 with the Air Commerce Act (see Table 1). This led to the establishment of the Aeronautics Branch, later called the Bureau of Air Commerce, located in the Department of Commerce. Authority was given to certificated pilots and aircraft to develop air navigation facilities, promote safety, and issue flight information. In 1958, the year in which American jets entered commercial service, Congress passed the Federal Aviation Act. This Act created the Federal Aviation Agency with broad authority to regulate civil aviation and provide for the safe and efficient utilization of the nation's air space. Eight years later the Department of Transportation Act of 1966 placed the FAA under the aegis of the Secretary of Transportation.

This allowed the FAA's functions to be considered in the context of a national transportation policy and allowed for the coordination of transportation modes, a function for which the Department of Transportation was created. Chief among the FAA's policies are the promotion of aviation safety and ensuring the efficient use of the nation's navigable air space. The FAA carries out its responsibilities by issuing and enforcing safety rules and regulations, certificating airmen, aircraft, aircraft components, air agencies, and airports, conducting aviation safety related-research and development, and managing and operating the national air space system.

The Civil Aeronautics Board (CAB) is the outgrowth of the Civil

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[1] Appendix I provides a much more detailed description of air transport regulation for interested readers.

Table 1

Development of Federal
Role in Civil Aviation

Year	Act	Agency
1926	Air Commerce Act	Aeronautics Branch Bureau of Air Commerce
1938	Civil Aeronautics Act	Civil Aeronautics Authority Civil Aeronautics Board
1958	Federal Aviation Act	Federal Aviation Agency
1966	Department of Transportation	Department of Transportation

Aeronautics Act of 1938 which established the independent Civil Aeronautics Authority with responsibility for both safety and economic functions. In 1940 the Civil Aeronautics Administration was created, which was placed under an Assistant Secretary in the Department of Commerce and a semi-independent Civil Aeronautics Board, and which reported directly to Congress but had administrative ties to the Department of Commerce.

The CAB has had many functions in the regulation of air transportation. These functions affected both the structure of the industry as it evolved over time and the day-to-day operating behavior of individual airlines. In terms of industry structure, the CAB controlled entry and exit from the industry by its authority to grant route certificates and to require the continuation of service to communities where strict financial considerations might not warrant the operation. This latter function was guaranteed through the use of a subsidy program. By its control of entry and exit, the CAB largely determined the number and size distribution of not only airline companies that operate within the industry but also the relative mix of different kinds of aircraft. Thus, the had an impact on aircraft manufacturers.

In cooperation with the FAA and other federal agencies, the CAB also had some impact on the cost structure of the airlines, and jointly with the FTC and Department of Justice affected the vertical integration and the degree of conglomeration within the industry.

In addition, the CAB was responsible for pricing, a major aspect of the operating behavior of the airline industry.

Until the Airline Deregulation Act of 1978, the CAB seemed to control all aspects of the development of the industry. The agency did not have to be concerned with the feedback effects of their pricing policies on industry

structure nor the impact of performance on industry structure, since it controlled the industry structure themselves.

In international aviation policy, the CAB has also played a strong role. Together with the Department of Transportation and the Department of State, the CAB has been responsible for negotiating agreements for international travel between the U.S. and foreign governments.

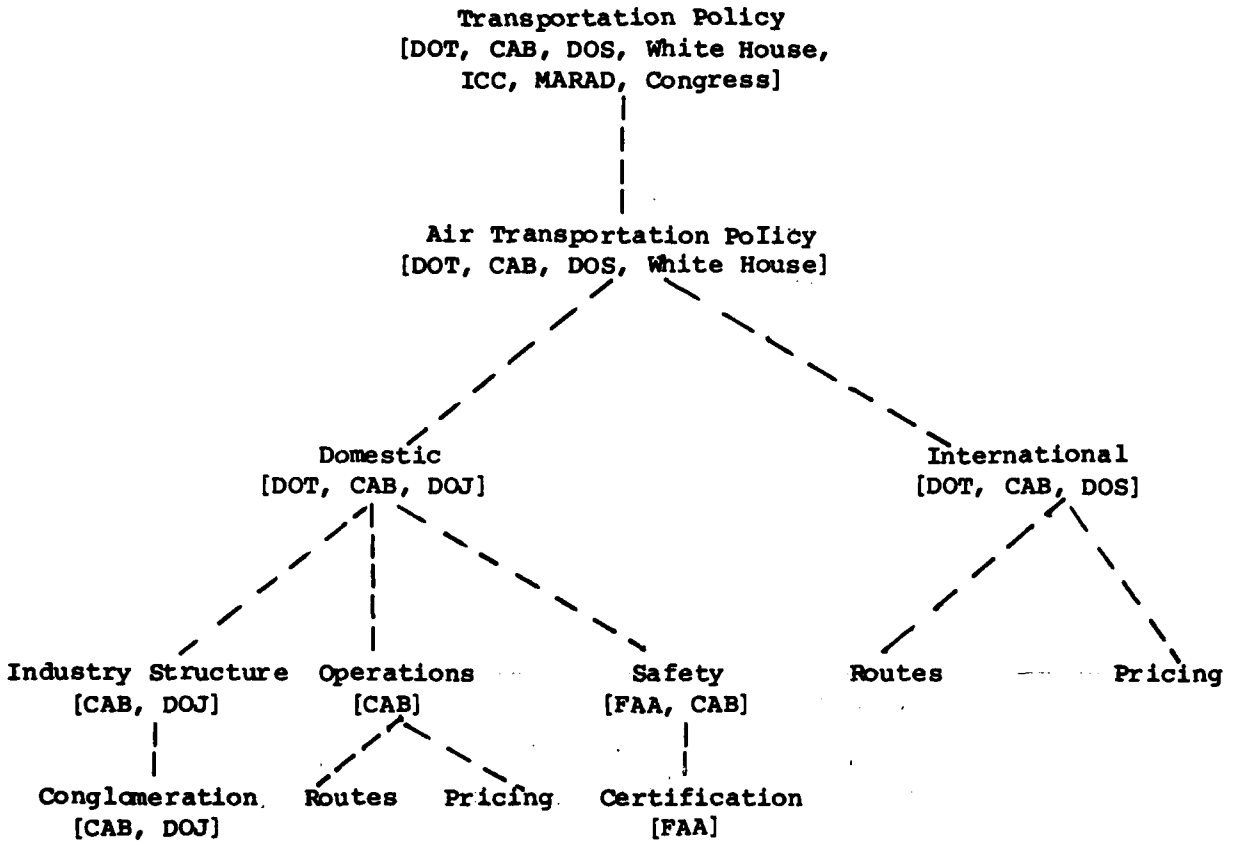
The Department of Transportation has responsibility for developing an overall transportation policy and implementing that policy with the cooperation of other agencies and departments (see Figure 1). It also oversees the functions of the FAA and provides the mechanism for coordination of air transport policy with other transportation modes' policies within the United States.

With respect to air cargo, the CAB and the Interstate Commerce Commission (ICC) have exercised controls over the operations of direct air carriers, air freight forwarders, and various types of surface carriers, the principal particpants in the air cargo industry. In varying degrees, some price regulation has also been imposed on the industry by these agencies.

Controls over entry and pricing have been of primary importance in determining the shape of the industry. Under the Federal Aviation Act of 1958, common carrier interstate air transportation requires CAB authorization, either by a certificate of public conveniences and necessity or by administrative exemption. Before the 1977 reform legislation, certificated all-cargo carriers were confined to specific routes and exclusively limited to the carriage of cargo, not passengers. Direct air carriers were allowed to carry passengers as well as cargo. However, until recently, their total payload could not exceed 7,500 pounds (recently changed to 18,000 pounds by

FIGURE 1

Flow of Government
Involvement in Air Transportation



Legend:

DOT	-	Department of Transportation (includes FAA)
FAA	-	Federal Aviation Administration
CAB	-	Civil Aeronautics Board
ICC	-	Interstate Commerce Commission
MARAD	-	Maritime Administration
DOS	-	Department of State
DOJ	-	Department of Justice

the CAB). Regulations prohibit air freight forwarders from engaging in air service, meaning they cannot operate aircraft without additional regulatory authority, although they can charter service. These charters may be obtained from supplemental as well as route-type carriers. Joint loading, where two or more air freight forwarders assemble their freight under one designated forwarder or shipper, has been permitted since 1955 for charters.

B. CAB Influence

In the past, there has been little overlap in functions and responsibilities between these government entities, at least to the extent where major frictions and differences of opinion have resulted in divergences in overall policy. Indeed, if one were to attach a priority ranking to the impact that the regulatory agencies have had on the industry, the prime mover would be the CAB. It is the CAB that had the power to alter the structure and operating behavior of the industry through its restrictions on entry, exit, and on fares. Once the overall structure was developed and the airlines and aircraft manufacturers responded with a particular mix of airplanes, it was and still is the FAA's responsibility to guarantee safety in travel not only in a development sense for the airlines but in day-to-day operations.

C. Deregulation

A number of recent regulatory actions have brought about actual or anticipated deregulation in the airline industry. This environment applies to both passenger and cargo travelling on domestic and international routes (see Table 1 above).

It appears at this time that the future regulatory environment will consist of the following:

Major Aspects of Future Regulatory Environment

.... Termination of all CAB functions.

.... FAA assumes total responsibility for safety and efficient use of air space.

.... DOT and DOS assume responsibility for international agreements.

.... DOT retains responsibility for data collection.

The airline system is in a process of dynamic change with a restructuring of the mix of aircraft in the service of all markets. It will be some time before it becomes clear what the future structure of the industry will be but some trends caused by the deregulation environment seem to be clear. They include the following:

1. The future number of competitive airlines may increase in the future as the smaller regional airlines forge into longer-haul markets in direct competition with the majors and local service carriers.

2. There may be a change in the fleet mix, primarily to the use of more fuel-efficient, short-range, large-capacity aircraft. Whether or not larger more fuel-inefficient aircraft will be eliminated from service will depend upon the financing aspects of replacement and capital availability, engine retrofit, and incurrence of extended fuel costs in order to save capital outlay.

III. ASSOCIATION FRAMEWORK[1]

A. Introduction

A large number of associations deal in some way with the airline industry. However, only a few have a significant impact on activities within the airline industry. Since many organizations provide specialized services for their members, most of which are tangential to the central focus of this study, these other organizations receive no attention here. Four associations are of primary importance for this study: the Air Transport Association, the Aerospace Industries Association, the International Air Transport Association, and the International Civil Aviation Organization.

B. Purpose and Effectiveness of Associations

The associations with the greatest impact on the industry influence the "supply side" -- the availability of airline services. Associations that deal with demand, either passengers or cargo, receive little attention here because of the relatively small role that they play relative to these major associations.

The effectiveness of associations is difficult to assess even in general terms, and it is even more difficult to quantify their effectiveness. However, it is possible to make some qualitative judgements about their efforts and to describe the proper perspective from which associations might be judged, both in their past performance and in the future environment in which airlines will operate.

Understanding the effectiveness of an association requires a clear

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[1] Appendix II describes the network and operations of aviation associations in more detail.

understanding of its purpose (whether it be in the airline or any other industry). An association is no more than a centralized collective storehouse that serves information transfer functions for a group or organization. It is a relatively inexpensive means of collecting industry-wide information, providing collective services, and providing a joint forum for expressing individual airline's ideas on certain issues. Using legal issues as an example, the cost for each airline to employ lawyers to evaluate a particular situation and to present its case to a representative public agency, Congress, or the Administration is far greater than each airline's share of a team of lawyers responding to common needs on a collective basis, formulating an industry position, and presenting that position to the appropriate public body. An association is the natural outgrowth of an efficient market behavior in obtaining needed services by individual firms.

The association itself has no more power than the collective power of each individual airline. However, it provides an inexpensive means of expressing that collective thought. It is important to understand that an association does not have an independent or autonomous governing body from which decisions are made about issues. Associations are not independently functioning organizations. They do not, of their own volition, have particular interests. Rather, they represent industry positions -- positions that are the joint positions of individual firms within the industry.

If it were possible to accurately measure the effectiveness of an association and its impact on a particular issue, such as fare structure, routes, safety, etc., it would still not be possible to distinguish that effectiveness in a manner different from the effectiveness of individual companies. It is fair to say that if the industry were able to affect fare

structure, it is the individual firms within the industry that affect fare structure, and that they have chosen to do it through a least cost mechanism of transferring information and private opinion -- the mechanism called an association.

The association framework in the airline industry is related to the regulatory framework. However, the relationship is one that generically relates the individual airlines to regulatory functions. Individual airlines have a particular vested interest in regulatory functioning and express their opinions on a regular basis to appropriate regulatory agencies. However, instead of expressing that opinion individually, they do it on a collective basis through the association.

C. Air Transport Association

The Air Transport Association (ATA),[1] founded in 1936, is the trade and service organization of the scheduled airlines that operate within the United States. ATA represents about 98 percent of all U.S. scheduled airline passenger service. Among the major objectives of the ATA, safety is the top priority, followed by the improvement of passenger and cargo traffic procedures, economic and technical research, and action on legislation that affects the airline industry. Consideration is also given to planning the airlines' role in augmenting national defense, as well as moving passengers and cargo across international borders. Environmental aspects of airline operations and meeting the energy needs of public transportation aslo receive association attention.

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[1] Appendix II-B lists the membership of the ATA.

D. Aerospace Industries Association

The Aerospace Industries Association of America (AIA),[1] the national trade association of aviation manufacturing companies, is engaged in research, development, and manufacture of aerospace systems, including manned and unmanned aircraft, missiles, space launch vehicles, and spacecraft, propulsion, guidance, and control units, as well as a variety of airborne and ground-based equipment essential to the operation of flight vehicles. The AIA began in 1917 when the Manufacturer's Aircraft Association was formed to facilitate aircraft production and patent problems during World War I. After the war, the Aeronautical Chamber of Commerce of America, Inc. was established by individuals and companies to promote aviation. During World War II, the Aeronautical Chamber of Commerce established eastern and western Aircraft Manufacturer's Councils to coordinate industry and government issues in the post-war era as aircraft manufacturers began taking a more active role in the organization. In June 1945 the Chamber's name was changed to Aircraft Industries Association, and many new responsibilities were added. In the 1950s, as the aircraft industry moved into new fields, particularly missiles and space systems, the Aircraft Industries Association became the Aerospace Industries Association (1959).

E. International Air Transport Association

The International Air Transport Association (IATA) is made up of 96 active members and 18 associate member airlnes from all over the world.[2] The

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[1] Members of the AIA are shown in Appendix II-C.

[2] Members of the IATA are shown in Appendix II-D.

primary aims of the IATA are to promote safe, regular, and economical air transport for the benefit of peoples of the world; to foster commerce, and to study the problems connected therewith; to provide means for collaboration among the air transport enterprises engaged directly or indirectly in international air transport service; and to cooperate with the International Civil Aviation Organization and other international organizations.

The activities of IATA have established its collective personality as the international air transport industries' link with governments and the public. It serves as a world parliament for the airlines and their representatives in international organizations. On the part of governments, IATA furnishes the medium for coordinating international rates and fares. It helps to carry out fast and economical international airmail transport and to guarantee that the needs of commerce and the safety and convenience of the public are always served.

The IATA was founded in 1945 by airlines from several different countries to help meet the problems anticipated in expanding civil air services at the close of World War II. It was the successor to the previous International Air Traffic Association which was organized in 1919 at The Hague. IATA is closely associated with the International Civil Aviation Organization, also established in 1945, which is the international agency of governments which creates world standards for the technical regulation of civil aviation. IATA is a voluntary, nonexclusive, nonpolitical, and democratic organization. Its membership is open to any operating company which is licensed to provide scheduled air service by a government which is eligible for membership in the ICAO. Airlines which are active in international operations are considered active members, while domestic airlines are considered associate members.

Under the IATA membership system, all member airlines are involved in the association's nontariff activities. Participation in the coordination of international fares and rates is left optional.

The trade association activities of IATA include such aspects as technical, medical, legal, facilitatation, research and industry finance, plus some noncompetitive matters which are also under the jurisdiction of its traffic conferences, including procedures in administrative matters. Tariff coordination activities include coordination of fares, rates and charges, and rates and levels of commission on sales.

F. International Civil Aviation Organization

The International Civil Aviation Organization (ICAO) is the outgrowth of a conference held in Chicago in November of 1944, called the Convention on International Civil Aviation, attended by 52 nations to consider the problems of international civil aviation. Ninety-six articles from that Chicago convention were established that describe the privileges and responsibilities of all the contracting states in order to provide for the adoption of international standards and recommended practices regulating air navigation. They recommended the installation of navigation facilities by member states and promoted the facilitation of air transport by the reduction of customs and immigration formalities.

Overall, the convention established some agreed-upon principles and arrangements so that international civil aviation could be developed in a safe and orderly manner, so that international air transport services could be established on the basis of equality of opportunity and operated soundly and economically. The convention provided that the ICAO would not come into being until the convention was ratified by 26 nations. A provisional organization

was formed with advisory powers to operate until the permanent organization was created. That occurred on April 4, 1947, and, at the invitation of the Government of Canada, Montreal was chosen as the headquarter's site for the organization. By November 1, 1980, 95 nations had accepted the transit agreement which made provision for aircraft of any signatory power to fly over or to land for technical reasons in the territory of any other signatory. Twelve states remain parties to an air transport agreement which calls for the carriage of traffic between the state of registration of the aircraft and any other signatory state.[1]

Article 44 of the Convention clearly states that the aims and objectives of the ICAO are "to develop the principles and techniques of international air navigation and to foster the planning and development of international air transport so as to: a) ensure the safe and orderly growth of international civil aviation throughout the world; b) encourage the art of aircraft design and operation for peaceful purposes; c) encourage the development of airways, airports, and air navigation facilities for international civil aviation; d) meet the needs of the people of the world for safe, regular, efficient, and economical air transport; e) prevent economic waste caused by unreasonable competition; f) ensure that the rights of the Contracting States are fully respected and that every Contracting State has a fair opportunity to operate international airlines; g) avoid discrimination between Contracting States; h) promote safety of flight in international air navigation; and i) promote generally the development of all aspects of international civil aeronautics."

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[1] Appendix II-E presents a list of the 150 member states.

G. European Civil Aviation Conference

The European Civil Aviation Conference (ECAC) was inaugurated in 1955 with 19 European states -- three more added by 1979, for a total of 22 states in its membership.[1] It is an autonomous organization but works closely with the ICAO, using the services of the ICAO Secretariat for much of its work. It has four standing committees, two that deal with economic issues, one with technical issues, and one with facilitation. The working groups and groups of experts are established as needed by the standing committees to carry out ECAC's functions. ECAC is to provide resolutions, recommendations, and other conclusions (which are always subject to the approval of its member states) to assist states in the preparation of their national regulations and give guidance to the practical, everyday work environment for aeronautical authorities.

H. Future Operations of Associations

It is not apparent at this time that the change in the regulatory environment will cause any structural change to the association framework. It seems likely that the individual associations described here and other associations that operate within the airline industry will maintain their primary functioning in the future. However, it is also highly likely that in a deregulated environment additional functions will fall to the associations. Studies that focus on capital availability, fuel costs, load factors, and other behavioral items that are so important in a competitive environment may receive additional attention at the association level. The guarantee of an adequate rate of return on investment by the airlines and the relationships

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[1] Appendix II-I shows the membership of the ECAC.

that were fostered with manufacturers in the regulated climate no longer exist, and thus individual airlines will need to be more careful about the consequences of their operating and financial behavior. Associations will likely play a larger role in these research areas.

It is also possible that in certain areas associations will relinquish power. Since fares and routes will no longer be regulated by some agency of the Federal government, and the industry itself will be more competitive, the association may be more restricted to the kinds of information that it collects, evaluates, and disseminates to its membership, primarily for antitrust purposes. From the initiatives to deregulate the airline industry and what impact that will have on the structure and behavior of individual airlines, the functioning of the associations described here will likely change during the course of that process.

IV. INDUSTRY COMPONENTS AND DEMOGRAPHICS

A. Introduction

Many factors define the nature of the components of the airline industry and affect their interaction. Some of these factors directly make up the industry, others are tangentially related to components of the airline industry, and still others more likely describe trends in the general economy. All of the factors, however, come together at some point to determine the current structure and performance of the civilian airline industry and influence its future mix of aircraft. The information provided here does not cover every possible aspect of the airline industry, nor does it describe all those factors that influence the industry, including trends in the general economy. Rather, factors are selected for emphasis that seem to be most important in describing the current state of the industry, and in judging the future.

This section highlights certain structural characteristics of the airline industry and addresses issues of behavior. The airlines themselves are described, including many general industry characteristics. Those segments of the industry that support and interact with general commercial aviation, such as travel agencies and air freight forwarders that influence cargo traffic, are included in this discussion. Appendix III provides additional detail on the structure, conduct and performance of the airline industry.

B. Carrier Groupings

Because deregulation has altered the structure of the airline industry, the Civil Aeronautics Board has re-defined the air-carrier groupings used for statistical and financial data anlaysis. The groups, determined according to

annual revenues are defined as Majors, Nationals, Large Regionals, and Medium Regionals, with all-cargo carriers are out separately.[1] The twelve Majors, shown in Appendix III-A, are roughly equivalent to the carrier grouping formerly called Trunk airlines. Many former regional airlines have moved into the category of Nationals, after expanding their service post-deregulation.

C. World Operations

Table 2 below shows world air transport operations for the years 1980 and 1979. In 1980, 734 million passengers traveled by air, a decrease of 1.7 percent from the 1979 figure of 747 million. While capacity, measured in terms of available seat kilometers, increased 7.3 percent, passenger load factor (Revenue Passenger Miles/Available Seat Miles) declined 5.6 percent over the two-year period, thus indicating an increase in supply coincident with a decrease in demand for air transportation services. While domestic freight ton kilometers decreased 3.3 perecent, there was an 8.3 percent increase internationally, resulting in an overall 4.5 percent increase in freight ton-kilometers (perfomed). Overall, international activity was more robust than domestic activity, especially in passenger service.

Figure 2 shows the world total revenue passenger miles broken out by U.S. and non-U.S., and charter versus scheduled service. Note that, since the late 1960s, non-U.S. scheduled growth in revenue passenger miles has grown at a much faster rate than U.S.-scheduled or U.S.-chartered service.[2]

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[1] Annual revenues for the carrier groups are as follows: Majors - over $1 billion; Nationals - $75 million to $1 billion; Large Regionals - $10 million to $75 million; Medium Regionals - $0 to $10 million.

[2] Appendix III-B shows world revenue passenger miles by region for 1978.

Table 2

World Air Transport Operations (1979 & 1980[1])

Activity	International		Domestic		Total		Percent Change - 1980 Over 1979		
	1980	1979	1980	1979	1980	1979	International	Domestic	Total
Passengers carried (000)	161,000	158,000	573,000	589,000	734,000	747,000	1.9%	-2.7%	-1.7%
Freight tonnes carried (000)	4,400	4,185	6,600	7,015	11,000	11,200	5.1	-5.9	-1.8
Passenger kilometres (millions)	463,000	440,000	608,000	617,000	1,071,000	1,057,000	5.2	-1.5	1.3
Available seat-kilometres (millions)	759,000	688,000	950,000	904,000	1,709,000	1,592,000	10.3	5.1	7.3
Passenger load factor (percent)	61.0	63.9	64.0	68.2	62.7	66.4	-4.5	-6.2	-5.6
Tonne-kilometres performed:									
Passenger (millions)	42,480	39,860	54,090	55,250	96,570	95,110	6.6	-2.1	1.5
Freight (millions)	20,200	18,660	8,850	9,150	29,050	27,810	8.3	-3.3	4.5
Mail (millions)	1,520	1,410	2,180	2,020	3,700	3,430	7.8	7.9	7.9
Available tonne-kilometres (millions)	112,000	98,300	112,000	111,500	224,000	209,800	13.9	0.4	6.8
Weight load factor (percent)	57.3	61.0	58.1	59.6	57.7	60.2	-6.1	0.7	4.2

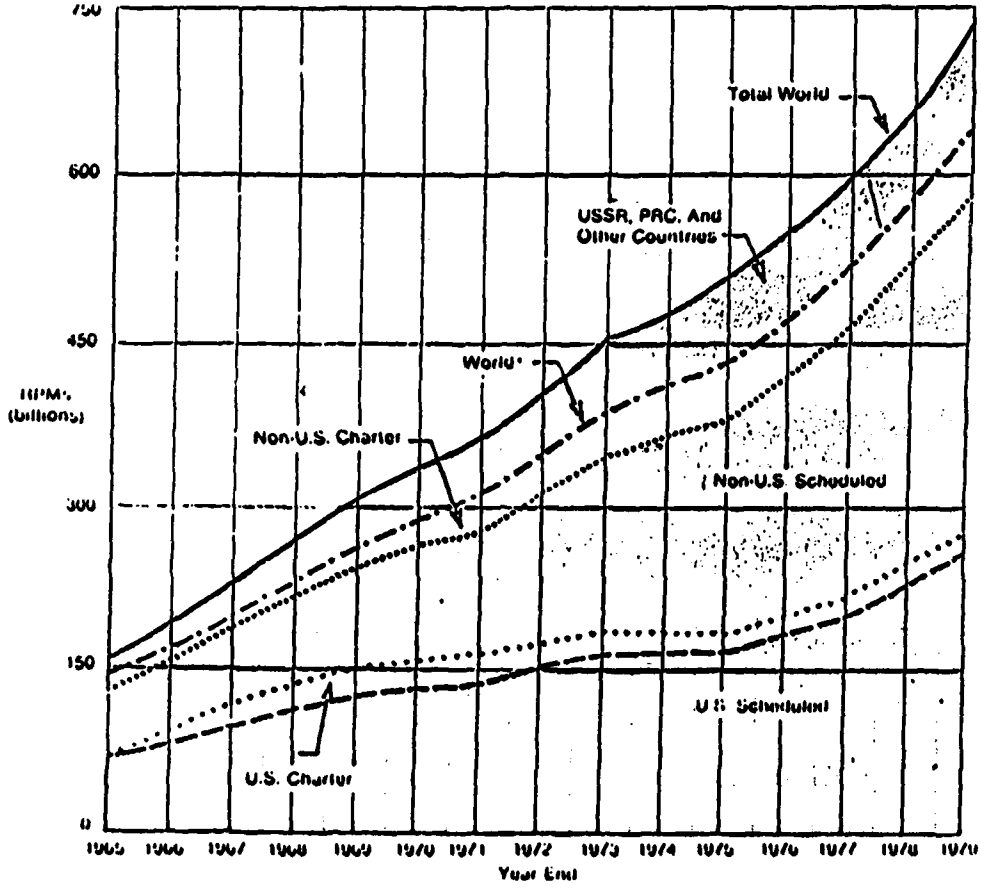
Source: International Air Transport Association, World Air Transport Statistics, 24 (June 1980): 7-9.

Note: Figures include USSR.

[1] Preliminary Figures; World Air Transport Statistics 1980 (June 1981).

FIGURE 2

World Total Revenue Passenger Miles



* Excludes USSR, PRC, and other countries, but includes Taiwan and all-charter carriers.

Source: Boeing Commercial Airplane Company, "Dimensions of Airline Growth" (March 1980), p. 18.

D. Air Cargo

Figure 3 shows an historical profile of cargo revenue ton miles. It shows up through 1979 a breakout of revenue ton miles for the world, U.S. and non-U.S., scheduled and unscheduled freight including charter, freight, and mail. It is clear from the figure that beginning in the mid-1960s, the non-U.S. airline scheduled freight began to grow at a much faster rate than growth in U.S. airlines scheduled freight.

E. Domestic Traffic History

It is also instructive to view traffic history by carrier class and by individual domestic carrier. These data are presented in Appendices III-C and D. The carrier class traffic history shows how in recent years, especially 1980, revenue passenger miles for the trunks declined with increases for the local and regional carriers. More detail on each domestic carrier, presented in Appendix III-C, shows how the on-flight passenger trip length has increased over time. Revenue passenger enplanements decreased for most of the major trunk carriers. For the local service group, revenue passenger enplanements have increased slightly, while passenger trip lengths have increased.

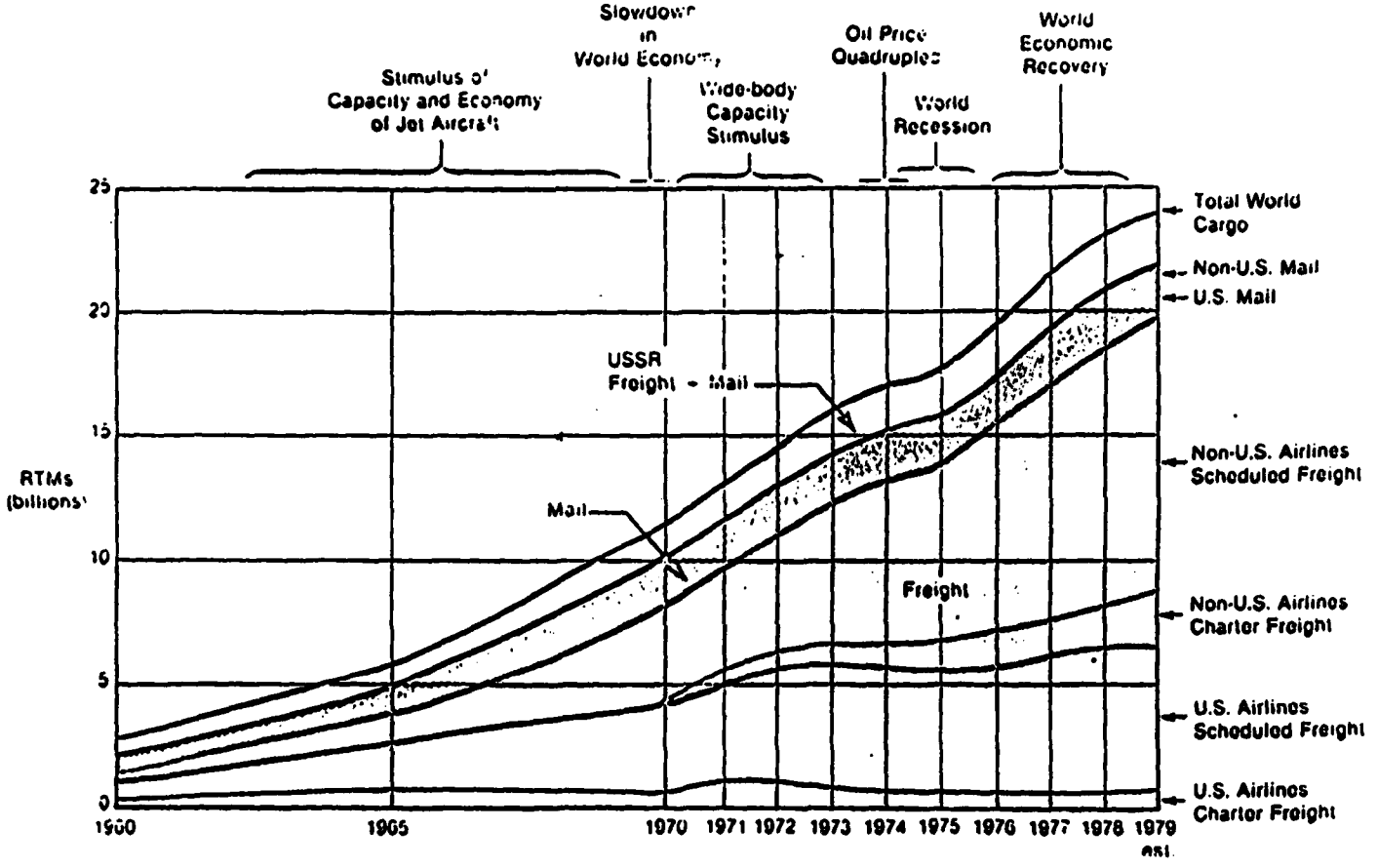
F. Employment

Since 1970, total industry employment for the airlines has fluctuated around 300,000 employees per year, except for the years 1979 and 1980, where that figure rose to approximately 340,000 employees. Between 1980 and 1981, however, employment fell dramatically with full-time employment decreasing about 13 percent and part-time employment decreasing about 20 percent.

The impact of these changes in labor in the industry can be evaluated by calculating output/labor ratios for the industry as a whole. As shown in

FIGURE 3

Historical Profile of Cargo Revenue Ton-Miles



Source: Boeing Commercial Airplane Company, "Dimensions of Airline Growth" (March 1980), p. 34.

Appendix III-E, there has been a continuing but slow improvement in available seat miles per employee over time for the industry as a whole, with larger fluctuations occuring within carrier classes (mainly due to individual airlines switching between carrier groups).

G. Travel Agencies[1]

In September of 1981, 18,712 travel agencies reported sales through the Air Traffic Conference, up from a 1980 year-end figure of 17,339, and 14,804 in 1978. In 1980, airline sales through travel agencies exceeded $18 billion, a 22 percent increase over 1979. At the end of September 1981 this volume was 15.25 billion, or 12 percent greater than the comparable total for 1980. Recent surveys show that there has been a rapid increase in the volume and number of corporate accounts handled by travel agencies. Through 1980 and 1981, the commissions paid on airline sales to agencies rose at rates faster than the gross dollar volume of air travel bookings, with the average compensation rate approximately 8.9 percent, up from 8.4 percent in 1979. In the first nine months of 1981, commissions were approximately $1.4 billion, a 23 percent increase over the same period in 1980. Indeed, the average commission rate per transaction hit a 9.9 percent all-time high in October of 1981.

The rise of commission payments to travel agencies by the airlines is clearly one of the benefits of the Airline Deregulation Act and its implementation by the Civil Aeronautics Board. The CAB began a complex investigation into the relationship between airlines and travel agencies

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[1] Appendix III-F provides additional detail on travel agency operations.

several years ago. In the fall of 1981, the CAB instituted tariff flexibility where carriers did not have to file official tariffs for domestic fares except for the normal coach fare. The individual airlines were free to offer unpublished discounts and to make whatever other pricing deals they wanted with favored clients. Whereas rebates were prohibited by Federal law in the past, this gave carriers the opportunity to make separate contractual arrangements with agents. However, given the PATCO strike and other current uncertainties, most airlines are expected to maintain the status quo where they require travel agents to adhere to published tariffs through contract agreements.

The travel agent industry as a whole is quite important to the operation of domestic airlines. A large percentage of airline tickets are written by travel agents, and agencies have some influence on the demand for individual airline service.

Passengers, whether business or travel that use particular airlines, exhibit a demand for air service for transportation from one destination to another. They do not, for the most part, demand the services of a particular airline. However, travel agents have a direct and deliberate demand for individual airlines and can heavily influence the operations of an individual airline by writing or by not writing tickets for that airline. Indeed, in the recent bankruptcy proceedings of Braniff International Airways, there were contentions made by Braniff officials that travel agents forced the airline into bankruptcy because of their reluctance to write tickts on Braniff routes (when the airline was in an unstable but not bankrupt financial position). Braniff contended that because the travel agents did not want to take a chance that the ticket would not be honored, they steered customers away from

Braniff, thereby causing the actual bankruptcy. One observer of airline operations, affiliated with a major investment banking house, attests to the power that is held by travel agents to control individual airline operations.[1] Whether the travel agents' influence over individual airlines is sufficient to affect the financial condition of individual airlines is not an issue for study here. However, it is important to point out that the travel agent industry does in general exert influence over the airline industry.

H. Airfreight Forwarders

In 1979, the estimated world air cargo market amounted to more than 24 billion revenue ton miles. Less than half of the traffic was transported in all cargo aircraft, with the remainder in combination service aircraft. Whereas U.S. carriers had accounted for 60 percent of this transport in 1960, their share had been reduced to approximately 33 percent by 1979.

U.S. carriers had an annual growth rate in air freight of about 20.7 percent during the first half of the 1960s and 10.6 percent during the second half of the decade. However, since 1970, growth has slowed to a little more than five percent annually. Since the mid-1960s, non-U.S. airlines have continuously outperformed U.S airlines in annual average growth. In fact, their share of total air cargo traffic has increased from 34.6 percent in 1960 to 58.9 percent in 1979.

World scheduled air freight growth during the last two decades has been influenced by a number of factors including: the introduction of standard

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[1] "Analyst Claims Retailers Control Airlines' Future", in Travel Weekly, March 11, 1982, p. 1.

body aircraft during the 1960s; slow down in world economies during the late 1960s and early 1970s; stimulus provided by wide body aircraft during the early 1970s; increased fuel prices during 1973-74; the 1974 recession and subsequent recovery; deregulation, and further increases in the price of fuel since 1974.[1]

Due to the various effects of regulation and increased fuel prices, air cargo became unprofitable during the 1970s. In fact, Continental, Delta and Eastern eliminated their scheduled freighter service in the mid-1970s, and American and United reduced their night time freighter service to reduce losses. On November 9, 1977, the air cargo deregulation bill was signed into law, opening competition in domestic markets by eliminating the CAB's control over entry and exit and sharply curtailing its jurisdiction over tariffs. By July 1980, the CAB had certificated 97 all-cargo 418 carriers, including supplemental carriers, air taxi operators and airfreight forwarders.

Since deregulation, the structure of the industry has changed dramatically. Some former supplemental carriers, freight forwarders and air taxi operators have inaugurated scheduled air freight service. There has been a dramatic increase in the number of air freight forwarders -- 1,284 in July of 1980, up from 366 in 1976. Four of these carriers, Airborne, Air Express International, Emory, and Profit by Air, operate 50 percent more freighters and serve twice the number of cities served by scheduled carriers.

Operating revenue for the top 20 air freight forwarders in 1980 was slightly more than $1.9 billion, a 0.4 percent increase over 1979. However, a more dramatic increase occurred between 1978 and 1979, with a 26.1 percent

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[1] See Appendix III-G for a description of a categorization scheme of factors affecting air freight movements.

increase in operating revenues for these twenty freight forwarders. Table 3 below shows the operating revenue for these top twenty freight forwarders for the years 1978-1980, with percentage changes between the years. The year 1979 was generally a good year where increases in operating revenue varied from -4.2 percent to 86.7 percent, with the four largest carriers increasing their operating revenues by roughly 25-30 percent over 1978. The change from 1979 to 1980 was not as good due to general conditions in the economy. In fact, Airborne showed an almost 18 percent decrease in operating revenue, Emory showed a 6.3 percent increase, and Profit by Air, a 12.3 percent increase.

I. Fare Determination Policies

Prior to the conclusion of the Domestic Passenger Fare Investigation (DPFI) in 1974, the Civil Aeronautics Board did not have comprehensive standards for evaluating industry-proposed tariffs. What resulted from the investigation was an inflexible normal fare structure based on average trip length given load factors that varied over distance. However, the formula produced identical fares for all equal distant markets, even though higher or lower fares might be suggested based on other considerations. Price competition was limited to the offering of an unrestricted promotional fare of the establishment of a new class of service.

In 1977, passenger fares began to deviate from the DPFI when the CAB approved "peanut fares" for Texas International and "supersaver" fares for American Airlines. Other discount fare proposals were filed, and in September of 1978 the CAB adopted its fare flexibility rule (PS-80) which allowed market-by-market price competition. The Airline Deregulation Act of 1978 replaced the DPFI and other criteria with the Standard Industry Fare Level (SIFL) which could be adjusted twice a year to reflect changes in actual

Table 3

Operating Revenue of Top-Twenty
Freight Forwarders, (1978)
(millions of dollars)

Forwarder	1980	% Change 80/79	1979	% Change 79/78	1978
1. Airborne Freight	202	-17.9	246	30.9	188
2. Air Express International	N/A	N/A	203	32.7	153
3. Amerford International	67	11.7	60	20.0	50
4. Associated Air Freight	26	81.3	32	14.3	28
5. Behring International	21	16.7	18	20.0	15
6. Bor-Air Freight	N/A	N/A	N/A	N/A	23
7. Burlington Northern	284	19.8	237	52.9	155
8. CF Air Freight	81	32.8	61	45.2	42
9. Circle Air Freight	111	33.7	83	50.9	55
10. DHL	52	85.7	28	86.7	15
11. Emergy Air Freight	539	6.3	507	25.2	405
12. Five Star	16	0	16	14.3	14
13. Imperial Air Freight	24	9.1	22	37.5	16
14. International Air Carrier	N/A	N/A	N/A	N/A	30
15. Profit by Air	91	12.3	81	26.6	64
16. Purolator	54	86.2	29	45.0	20
17. Sentry Air Freight	3	3.0	0	0	11
18. United Parcel Service	192	40.1	137	24.5	110
19. WITS	24	4.3	23	-4.2	24
20. WTC	114	24.5	111	32.1	84
TOTAL	1901	0.4	1894	26.1	1502

Source: U.S. Civil Aeronautics Board

industry costs. Appendix III-H provides additional information about the development of these fare schedules and provides the formula for January 1, 1982 cost determination according to miles travelled.

J. Operating Costs

Operating costs have increased dramatically in the last few years, contributing to the financial difficulties of several major airlines. This is best demonstrated by a composite cost index for system trunks and local service carriers, developed by the Air Transport Association. The index shows an increase in values over the last decade from 88.0 in 1970 to 262.2 in 1980 and approaching a value of 300 in the third quarter of 1981. Table 4 below shows the composite cost index from 1970 through the third quarter of 1981 (where the three quarters of 1981 are averaged and used to represent the entire year), along with several cost components. The table also shows the percentage increase over the previous year for each index. Note the substantial increase in fuel costs beginning in 1974. Also note the relative fluctuation of advertising and promotion expenditures over the entire decade.[1]

K. Aircraft Operating Expense Comparisons

In addition to focusing attention on the airline industry, carrier classes, and differences among airlines, it is instructive to also highlight differences that exist in operating characteristics across different aircraft types. Figure 4 below shows aircraft flying operating expense per available

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[1] Appendix III-J presents graphs of individual cost components relative to the GNP deflator.

Table 4

Cost Index
System Trunks and Local Service Carriers
1972 = 100.0

	Composite		Components							
			Labor		Fuel		Landing Fee		Interest	
	Index 1972= 100	% Increase Over Previous Year	Index 1972 100	% Increase Over Previous Year	Index 1972= 100	% Increase Over Previous Year	Index 1972= 100	% Increase Over Previous Year	Index 1972= 100	% Increase Over Previous Year
1970	88.0	-	83.0	-	93.7	-	81.0	-	108.1	-
1971	93.5	6.3%	91.0	9.6	97.0	3.5	94.4	16.5	103.6	(4.2)
1972	100.0	7.0	100.0	9.9	100.0	3.1	100.0	5.9	100.0	(3.5)
1973	107.3	7.3	106.9	6.9	109.3	9.3	109.6	9.6	116.2	16.2
1974	127.7	19.0	117.9	10.3	208.0	90.3	125.5	14.5	127.9	10.1
1975	141.4	10.7	129.2	9.6	249.7	20.0	134.2	6.9	116.0	(9.3)
1976	152.8	8.1	141.7	9.7	271.6	8.8	153.2	14.2	113.1	(2.5)
1977	169.4	10.9	160.6	13.3	310.6	10.7	159.4	4.0	132.0	16.7
1978	183.2	8.1	178.1	10.9	336.8	8.4	159.1	(0.2)	152.1	15.2
1979	210.8	15.1	190.5	7.0	496.0	47.3	175.8	10.5	150.6	(1.0)
1980	262.2	24.4	213.2	11.9	766.1	54.5	194.4	10.6	175.9	16.8
1981[1]	294.9	12.5	234.3	9.9	893.9	16.7	213.5	9.8	199.8	13.6

[1] 1981 yearly average based on first three quarters only.

Source: George W. James. Airline Cost Index, Air Transport Association of America, Washington, D.C., September 8, 1981.

Table 4 (continued)

Cost Index
System Trunks and Local Service Carriers

	Air Maintenance Material		Traffic Commission		Passenger Meals		Advertising and Promotion	
	Index 1972= 100	% Increase Over Previous Year	Index 1972 100	% Increase Over Previous Year	Index 1972= 100	% Increase Over Previous Year	Index 1972= 100	% Increase Over Previous Year
1970	97.9	-	82.2	-	95.8	-	99.7	-
1971	86.3	(11.8)	89.9	9.4	94.6	(1.3)	98.8	(0.9)
1972	100.0	15.9	100.0	11.2	100.0	5.7	100.0	1.2
1973	107.2	7.2	109.6	9.6	105.6	5.6	96.4	(3.6)
1974	124.6	16.2	132.4	20.8	110.3	4.5	95.1	(1.3)
1975	121.1	3.6	152.5	15.2	118.1	7.1	100.0	5.2
1976	138.2	7.0	177.7	16.5	118.7	0.5	97.3	(2.7)
1977	148.5	7.5	189.4	6.6	124.3	4.7	105.2	8.1
1978	147.9	(0.4)	198.7	4.9	125.1	0.6	100.6	(4.4)
1979	149.6	1.0	229.3	15.4	135.8	8.6	105.7	5.1
1980	164.0	9.6	321.0	40.0	153.9	13.3	133.1	25.9
1981[1]	168.1	2.4	395.5	23.2	165.9	7.8	153.7	15.5

[1] Same as above.

Source: George W. James. Airline Cost Index, Air Transport Association of America, Washington, D.C., September 8, 1981.

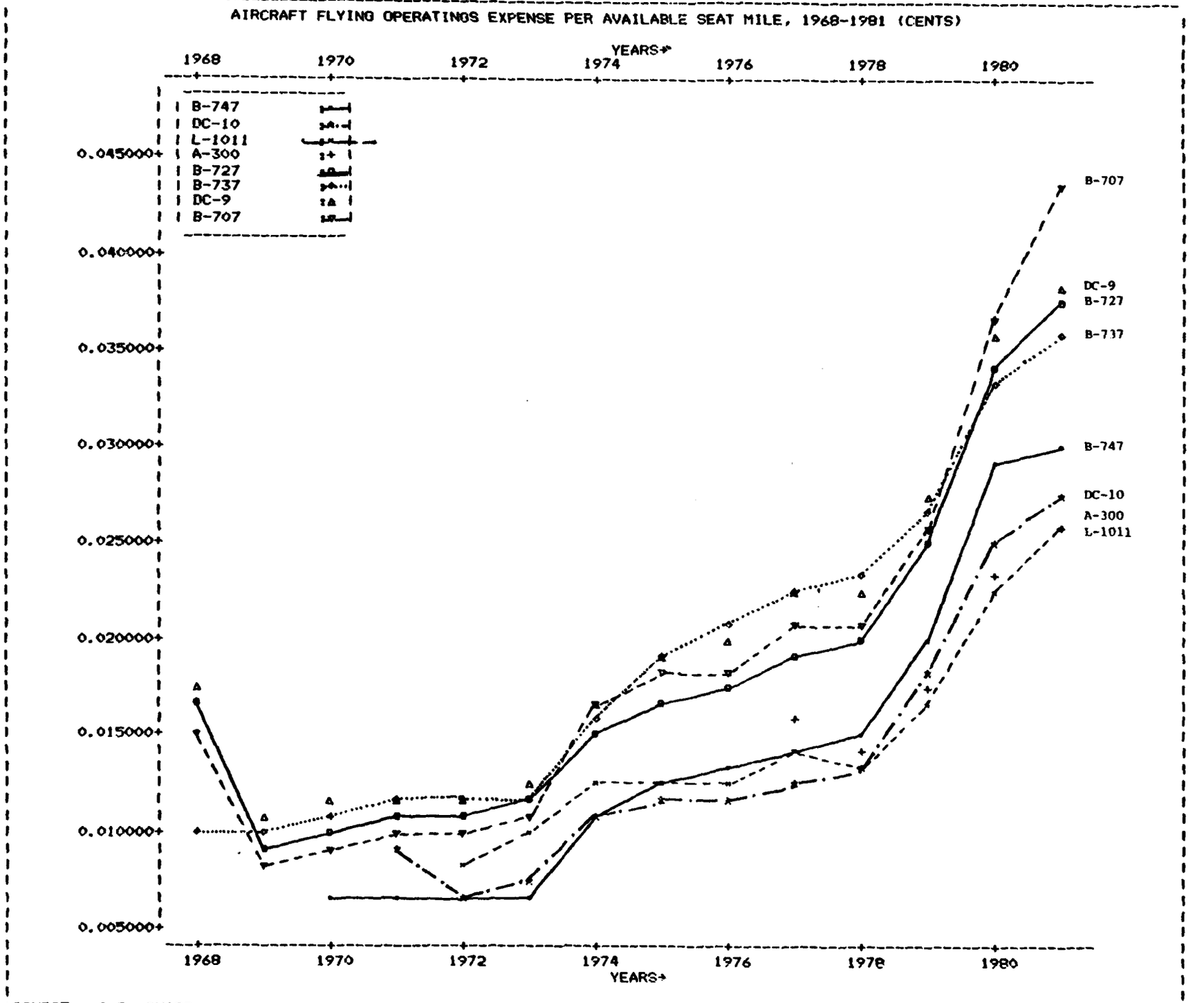
AIRCRAFT FLYING OPERATINOS EXPENSE PER AVAILABLE SEAT MILE, 1968-1981 (CENTS)
YEARS→
1968
1970
1972
1974
1976
1978
1980
B-747
DC-10
L-1011
A-300
B-727
B-737
DC-9
B-707
0.045000
0.040000
0.035000
0.030000
0.025000
0.020000
0.015000
0.010000
0.005000
B-707
DC-9
B-727
B-737
B-747
DC-10
A-300
L-1011
SOURCE: I.P. SHARP

FIGURE 4

seat mile over the period 1968 to 1981 for a select number of aircraft. Included are wide bodies, such as the Boeing 747, the DC-10, the L-1011 and the A-300, and narrow body jets such as the Boeing 727, 737 and 707, as well as the DC-9. Operating expense per available seat mile is a widely used measure of supply costs in the passenger industry. It is apparent that the wide body aircraft as a group show lower operating expense per available seat mile than do narrow body jets, with that relationship conistent throughout the time period surveyed. Figure 5 shows the same operating expense relative to revenue passenger miles, a standard measure of demand. The expense per revenue passenger mile for the wide body jets was considerably less than that for the standard body jets.[1]

Figures 6 and 7 show aircraft operating expense per block hour (ramp to ramp) by aircraft type for fuels and oils between 1968 and 1981. For wide body jets (Figure 6) fuels and oils operating expense per block hour have increased for all aircraft types. The only slight aberration over the entire period is for the DC-10 in 1977, which showed a sharp increase over 1976 levels, dissimilar from what occurred with other aircraft types. All of the wide body jets showed sharp increases through 1980, with declines experienced in 1981 as fuel costs declined. Figure 7 shows a similar pattern for narrow body jets. While the period from 1969 to 1973 showed relatively low expense per block hour, increases began in 1973 following the Arab oil embargo.

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[1] There are a few instances in the earlier years where the costs for wide body and narrow body jets are similar and even an instance or two of a narrow body jet having lower operating costs per revenue passenger mile than the wide body jets. Where expense per revenue passenger mile for narrow body jets are below costs for a wide body jet, that result is due more to fluctuations in revenue passenger miles than to the actual operating expense of that aircraft type.

FIGURE 5

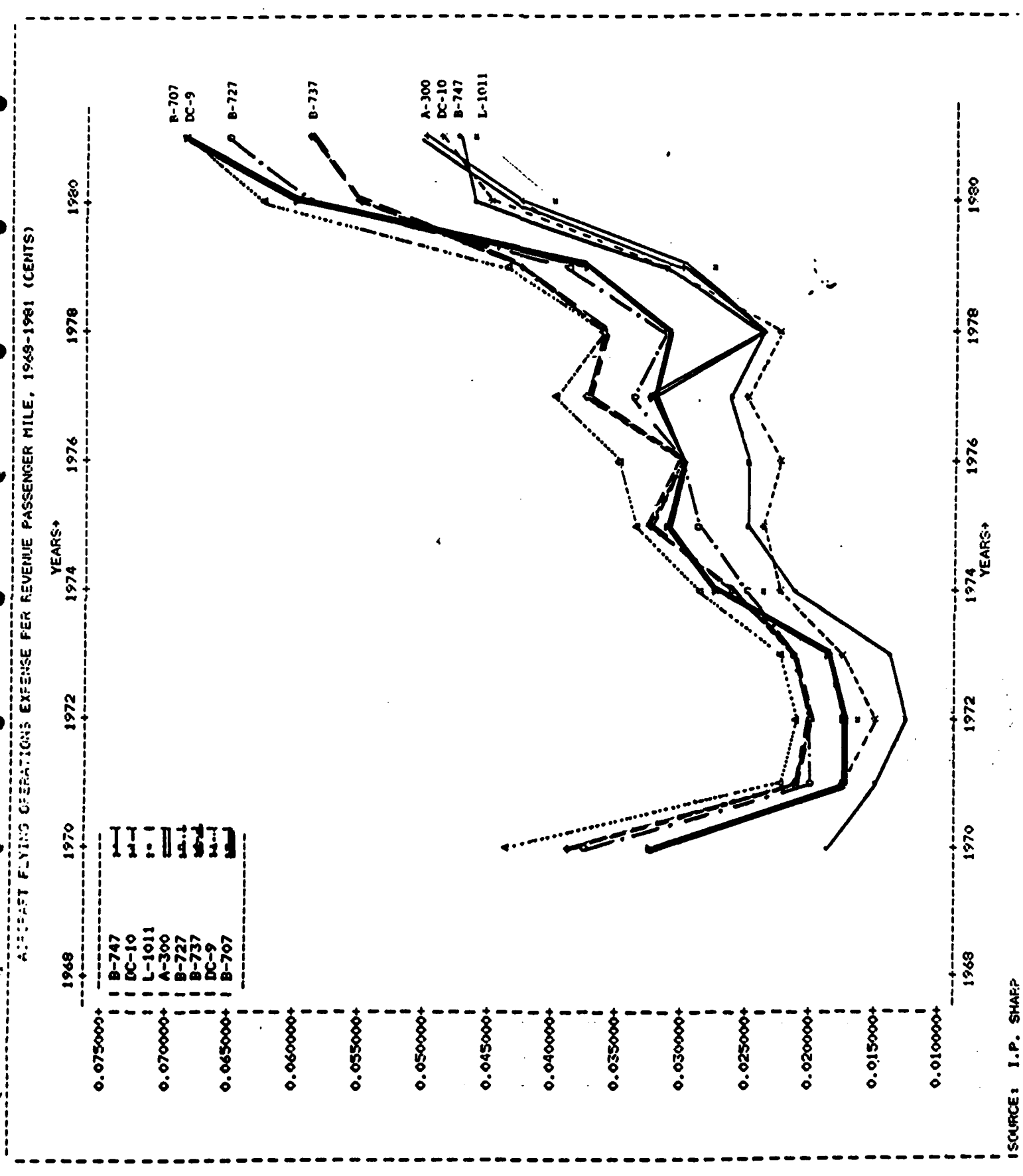

AIRCRAFT FLYING OPERATIONS EXPENSE PER REVENUE PASSENGER MILE, 1969-1981 (CENTS)
YEARS
1968
1970
1972
1974
1976
1978
1980
0.075000
0.070000
0.065000
0.060000
0.055000
0.050000
0.045000
0.040000
0.035000
0.030000
0.025000
0.020000
0.015000
0.010000
B-747
DC-10
L-1011
A-300
B-727
B-737
DC-9
B-707
B-707
DC-9
B-727
B-737
A-300
DC-10
B-747
L-1011
SOURCE: I.P. SHARP

FIGURE 6

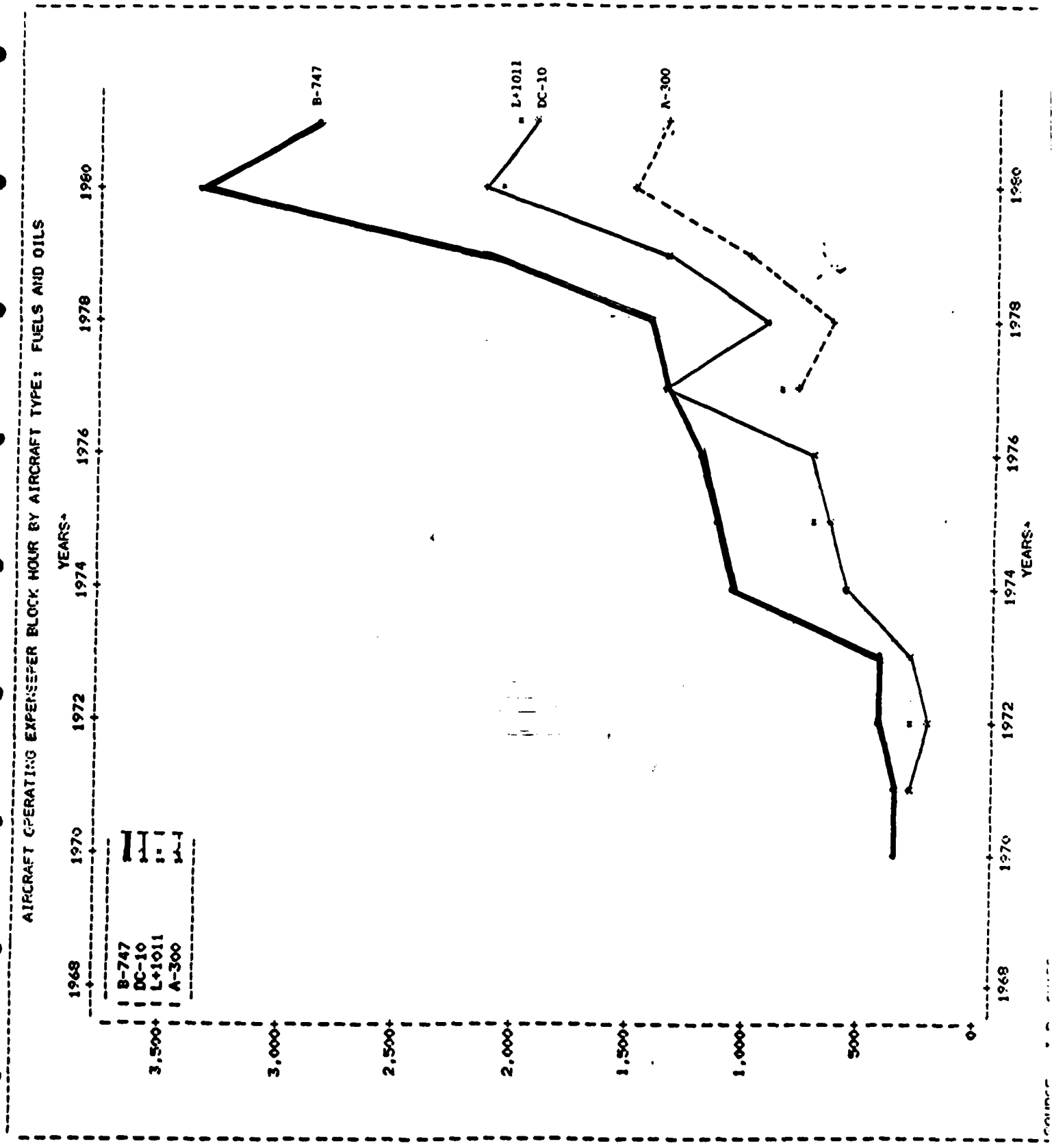
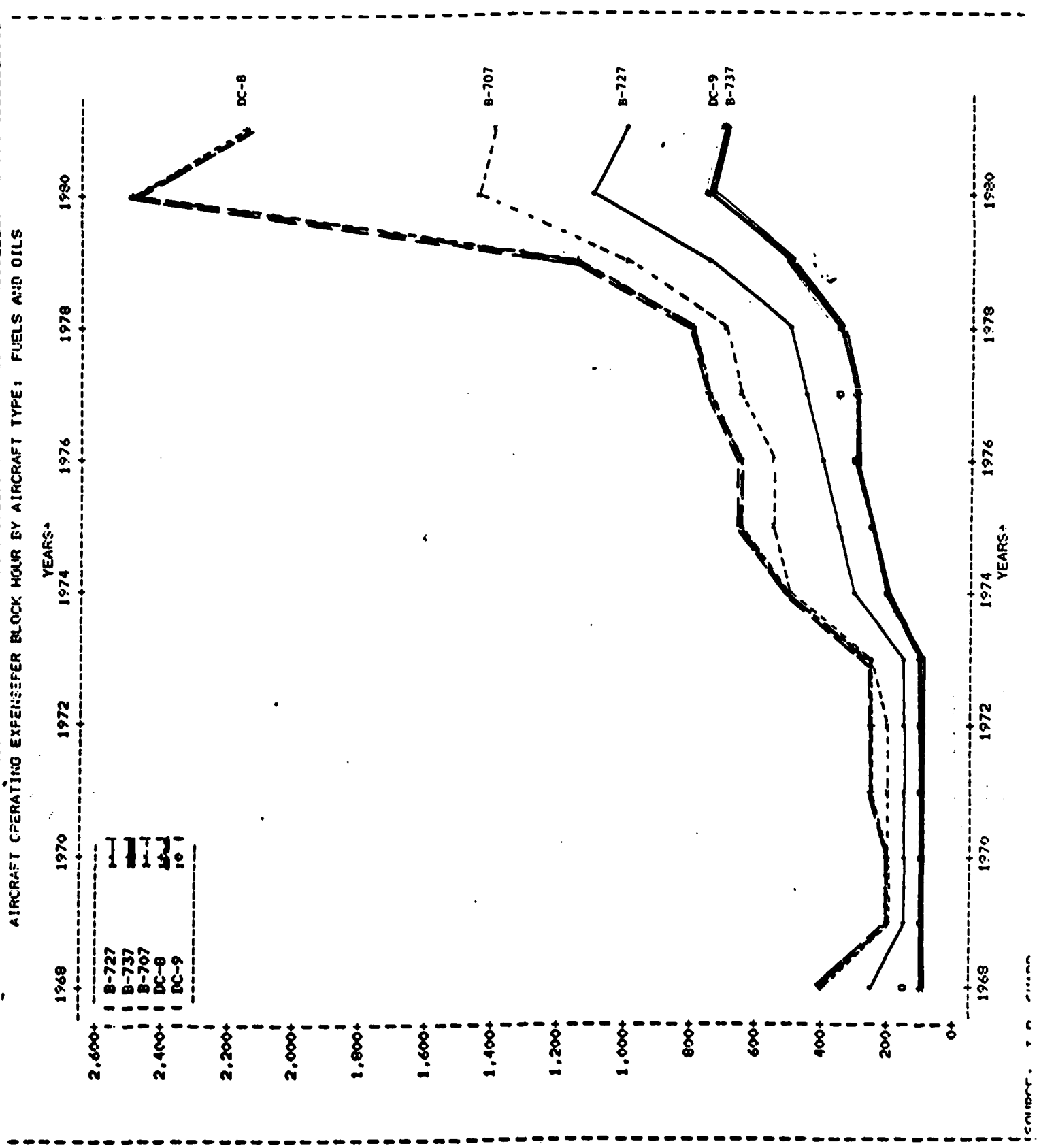

AIRCRAFT OPERATING EXPENSE PER BLOCK HOUR BY AIRCRAFT TYPE: FUELS AND OILS
B-747
DC-10
L-1011
A-300
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1968
1970
1972
1974
1976
1978
1980
YEARS

FIGURE 7


AIRCRAFT OPERATING EXPENSE PER BLOCK HOUR BY AIRCRAFT TYPE: FUELS AND OILS
B-727
B-737
B-707
DC-8
DC-9
DC-8
B-707
B-727
DC-9
B-737
2,600
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
1968
1970
1972
1974
1976
1978
1980
YEARS

Increases became sharper during the period 1978 to 1980 with declines in 1981.[1]

L. Load Factors

Load factor is defined as the percentage of capacity used (in standard measures used by the airlines the percentage of available seat miles accounted for by actual revenue passenger miles). Load factors can be evaluated for the industry, carrier groups, individual aircraft type, and on a per company basis. An increase in load factor signals an improvement in the productivity of operations resulting in reduced per passenger costs and may also result in reducing air fares. However, the higher the load factor, the lower the quality of service in terms of convenience.[2]

The average system load factor for U.S. domestic operations for trunk and local service carriers increased from 45.9 percent in early 1971 to a high of 69 percent during the second quarter of 1979 and then declined to 59.7 percent during the second quarter of 1981. Average load factors during the last decade indicate some increase in efficiency and reduced per passenger costs. Declining fares and increasing costs have raised the breakeven load factors, i.e., the load factors at which 100 percent of the fixed costs are recouped.

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[1] See Appendix III-K for more detail on aircraft specific operating and cost data.

[2] Average load factors, however, are misleading because of the time sensitive nature of air transport demand. The supply of air transport is instantly perishable in that empty seats available on a given route on a given day of the week are lost the instant the flight departs and thus do not aid in meeting the demands of passengers on a different day of the week on that same route. Yet, in determining the average load factor the empty seats from both days are merged statistically. Thus, it is important to recognize the extent to which the demand for air travel fluctuates above and below over all monthly averages. See Appendix III-J for a more detailed discussion of load factor.

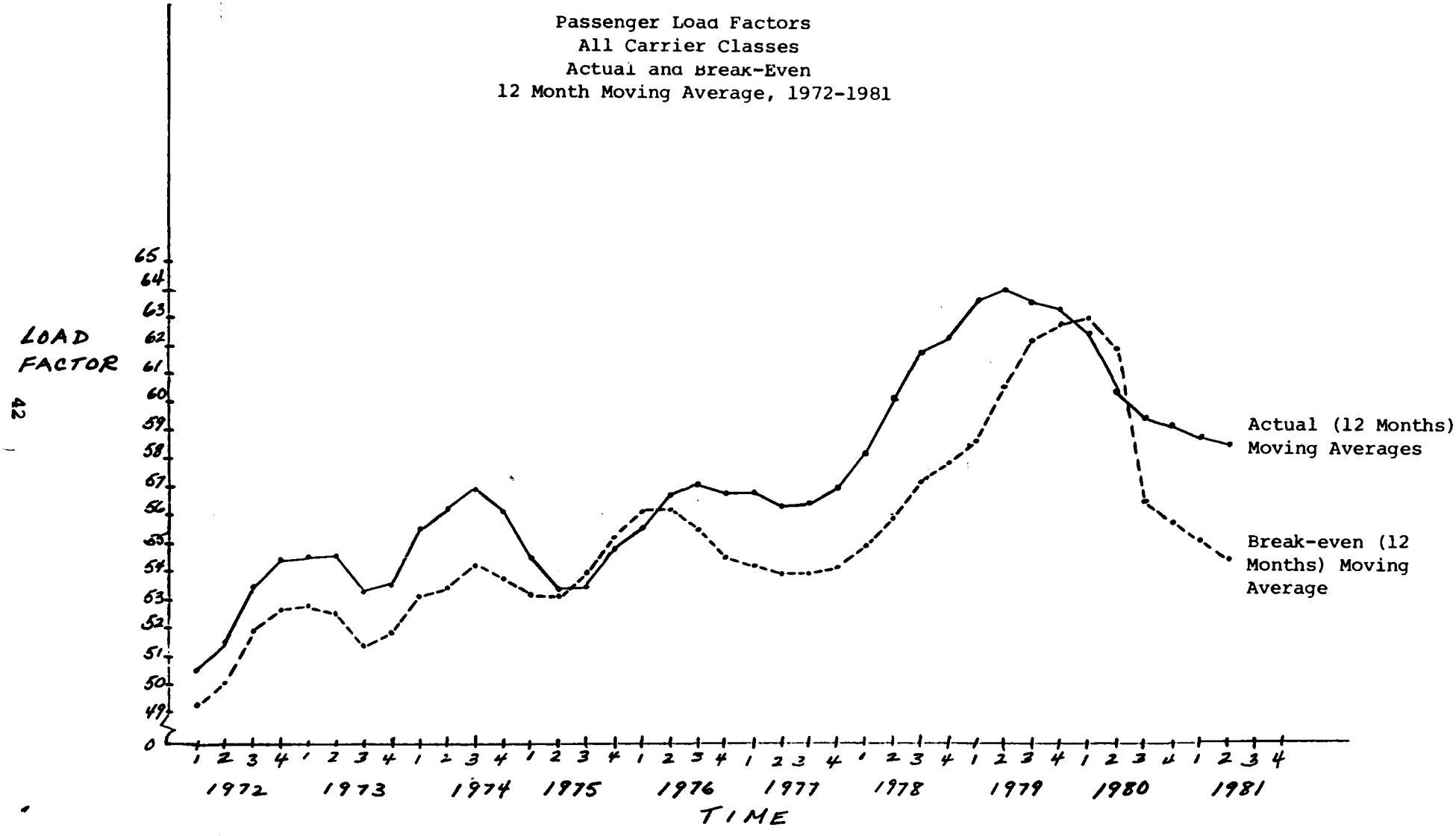
Figure 8 below shows actual and breakeven load factors (quarterly, in annual averages) from the first quarter of 1971 through the second quarter of 1981. It is apparent that over time actual and breakeven load factors have risen. Indeed, from the second quarter of 1978 through the third quarter of 1980, many actual load factors were in excess of 60 percent, a rate that two years ago was reached only during peak periods. During the fourth quarter of 1979 and the first two quarters of 1980, actual load factors were below the break even point, another indication of the industry-wide losses being incurred.

Load factors can also be evaluated by individual aircraft types or general categories. Figure 9 below shows passenger load factors by aircraft type. The figure shows that wide body aircraft such as the A-300 experienced wide fluctuations in load factors over the period 1977 to 1981, exhibiting the general downward trend most likely affected by declines in air service demand over these weak economic times. The 747s, DC-10s, and L-1011s all showed an upward trend in load factors which declined from 1979 to 1980 and increased in 1981 (except for the L-1011 which showed a decline from 1980 to 1981). The narrow body jets, the 727s, showed an increase over the period up to 1979 but a decline from 1979 to 1981. The DC-9 passenger load factor followed the 727 very closely as did the 737. The Boeing 707 aircraft which consistently had low passenger load factors compared to the other aircraft shows increases over the period, a sharp decline from 1979 to 1980 and then an increase in 1981. A similar pattern is shown for the DC-8 except that that aircraft distinguishes itself by having a very low load factor, approximatly 42 percent in 1971, increasing to approximately 55 percent in a short two-year period, from 1971 to 1973. It is apparent that different aircraft types have responded to change in economic conditions in different ways. Most of the wide body

FIGURE 8

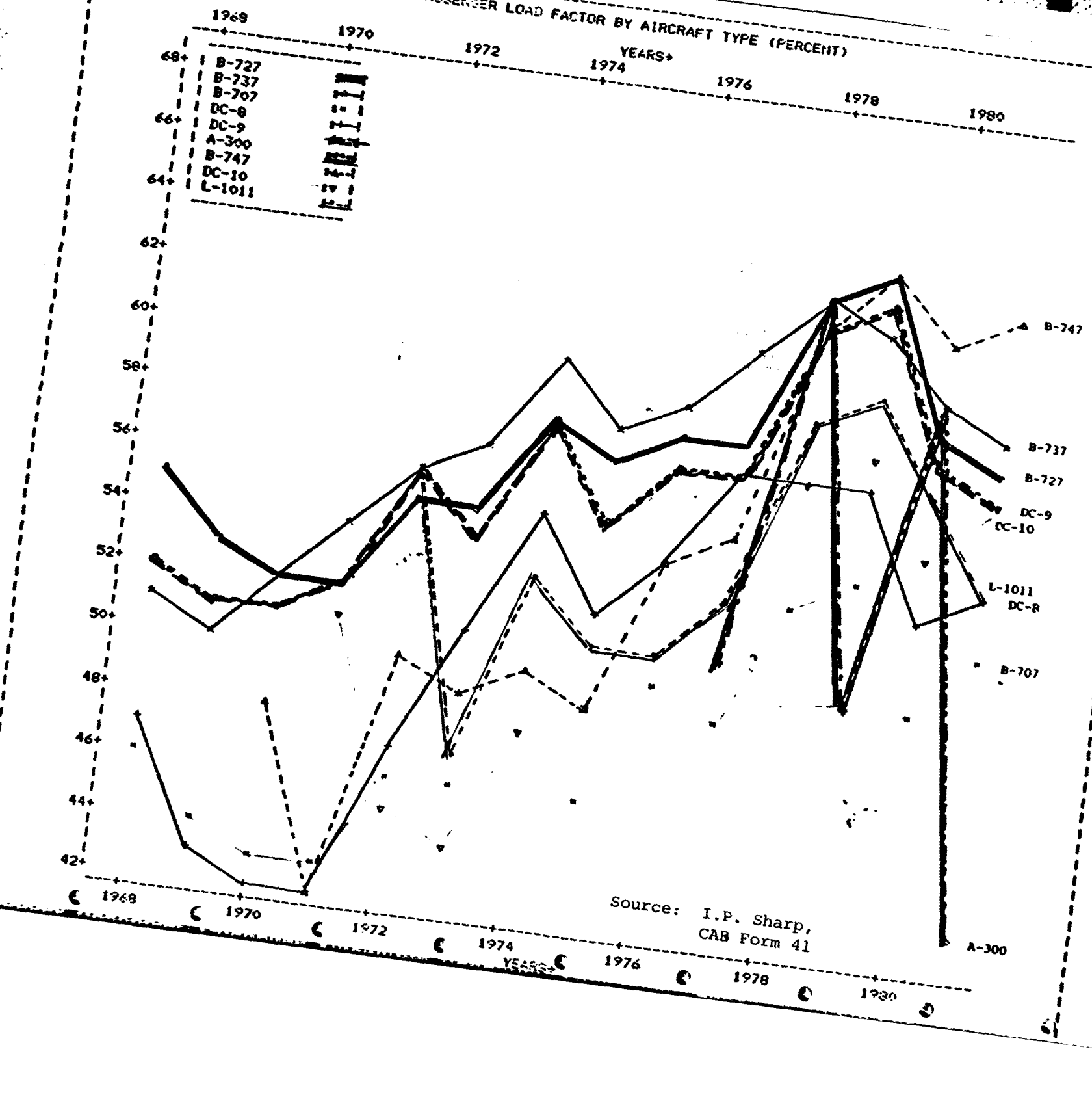
Break-Even Load Factor
(Trunks and Local-Service Carriers)

Passenger Load Factors
All Carrier Classes
Actual and Break-Even
12 Month Moving Average, 1972-1981



Source: U.S. Civil Aeronautics Board.

PASSENGER LOAD FACTOR BY AIRCRAFT TYPE (PERCENT)



Source: I.P. Sharp,
CAB Form 41

FIGURE 9

aircraft that show general increases in load factors over the time period surveyed here have responded to declining revenue passenger miles by reducing available seat miles, resulting in higher load factors. Those aircraft have been quick to respond in terms of capacity and changing demand. One might consider the fluctuations in load factor for the A-300 as more than aberation relative to the other aircraft surveyed here and representing the logical response to declining demand. It seems likely that the declining load factors on the part of the A-300 were caused by their unwillingness to adjust the capacity to change in demand.

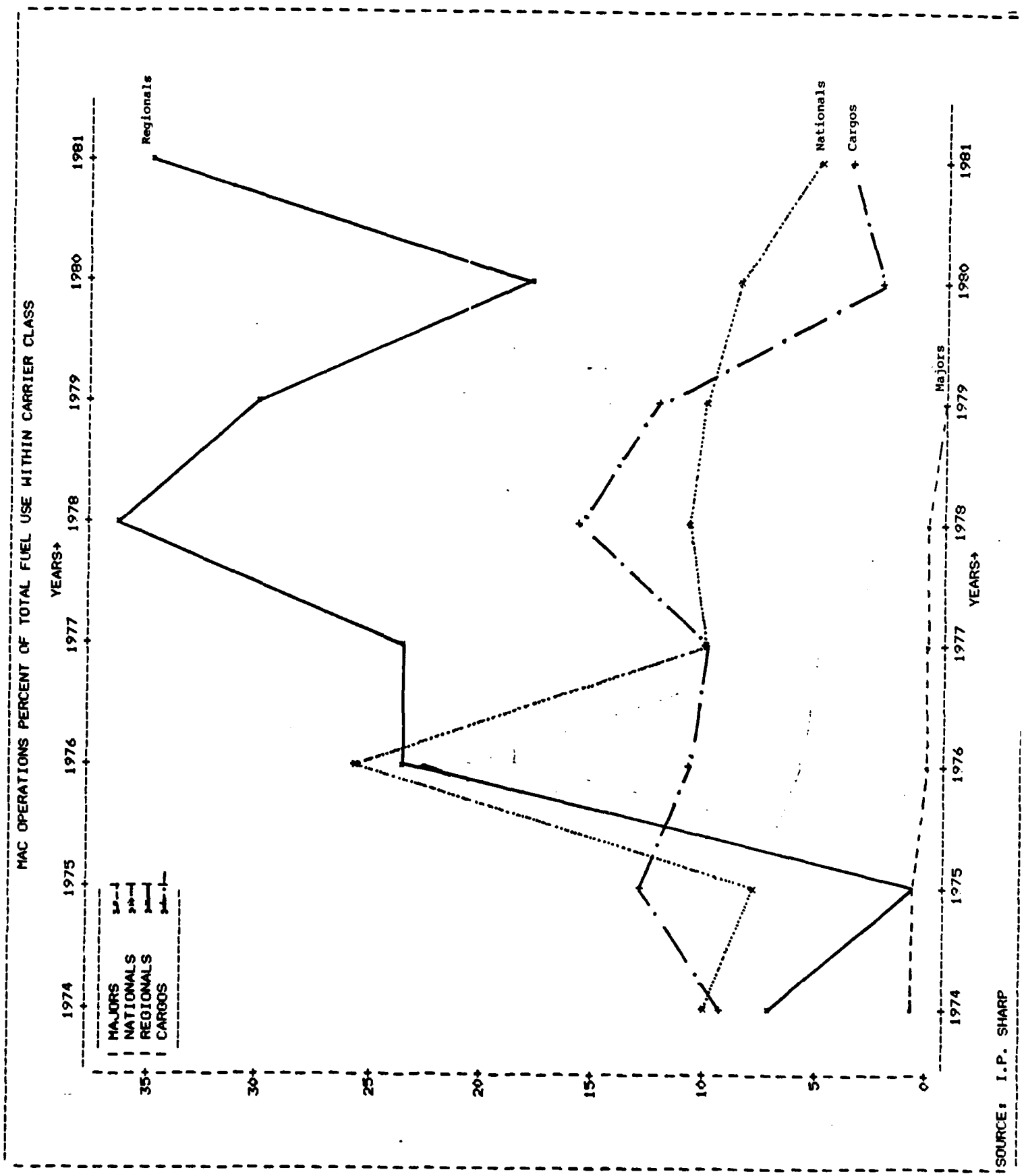
M. Airline Participation in Military Airlift

For many years, U.S. airlines have hauled military passengers and cargo, and that carriage in some instances represents a significant portion of total airline business. Over the last eight years there has been a large fluctuation in carrier class support of MAC operations. Figure 10 below shows fuel use in MAC operations as a percent of total fuel use for each of the four carrier classes. Only the Regional carriers show a distinct upward trend in their percent of total fuel use accounted for by MAC operations, moving from a low of approximately 1 percent in 1975 to a peak of over 35 percent in 1978, and approximately 35 percent in 1978, and approximately 35% again in 1981. Nationals decline over the period, as do Cargo carriers. Majors from 1974 to 1979 had a very small proportion of MAC operations accounting for their fuel use and stopped all MAC operations in 1979.

N. Route Structure and Competition

Although long-haul high density routes have traditionally been served by trunk carriers, with local service carriers handling the short-haul feeder

FIGURE 10


MAC OPERATIONS PERCENT OF TOTAL FUEL USE WITHIN CARRIER CLASS
MAJORS
NATIONALS
REGIONALS
CARGOS
YEARS→
1974
1975
1976
1977
1978
1979
1980
1981
35+
30+
25+
20+
15+
10+
5+
0+
Regionals
Nationals
Cargos
Majors
SOURCE: I.P. SHARP

routes, the process of deregulation has intensified the local service carriers interest in longer-haul high density routes. Their average passenger trip length increased between the first quarter of 1979 and the first quarter of 1980 by 12.37 percent, compared with a 1.8 percent increase for the trunk carriers.

Table 5 shows the concentration of passenger traffic in the U.S. domestic city pairs ranked by passenger volume. Less than 2 percent of city pairs account for more than 70 percent of the passengers with the most dense route (in terms of passenger volume) being the New York to Washington, D.C. route, with more than 6,500 passengers daily. The table reveals that for those city pairs that have data available for 1979, there is a wide variation in the change in the number of passengers that travelled on those city pairs between the two years, ranging from a high of 47.4 percent for the Los Angeles-San Francisco group to a -7.7 percent change for the Chicago-New York City route.[1]

In addition to this change in average trip length, the industry has increased its focus on developing the hub and spoke-type of route structure.

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[1] Appendix III-L presents additional information on the extent of route competition.

Table 5

Concentration of Passenger Traffic in the U.S. Domestic City-Pairs (10 Percent Sample for Twelve Months Ending 30 September 1979 and September 1980)

1980 Rank	City-Pair	1980 Passengers (10% Sample)	% Change 1980-1979	1980 Cumulative % of Total
1	NYC/Newark-Wash., D.C.	240,227	9.4	1.24
2	Los Angeles-NYC	234,157	12.6	2.46
3	Boston-NYC	227,116	7.6	3.63
4	Miami-NYC	224,460	14.7	4.79
5	Los Angeles-San Francisco	209,186	47.4	5.88
6	Chicago-NYC	191,437	-7.7	6.87
7	Ft. Lauderdale-NYC	175,122	1.1	7.77
8	NYC/Newark-San Francisco	155,467	14.9	8.58
9	Dallas/Ft. Worth - Houston	146,123	N/A	9.34
10	Chicago-Los Angeles	109,951	2.6	9.90
20	Los Angeles-Seattle/Tacoma	66,516	3.4	14.03
30	Los Angeles-San Jose	55,378	N/A	17.17
40	San Diego- San Francisco	49,025	N/A	19.88
50	Chicago-Las Vegas	44,660	N/A	22.29
60	Austin-Dallas/Ft. Worth	37,596	N/A	24.43
70	Chicago-Phoenix	35,707	N/A	26.32
80	Dallas-Lubbock	33,646	N/A	28.10
90	Houston-San Antonio	30,864	N/A	29.74
100	Boston-Ft. Lauderdale	28,560	N/A	31.26
200	Atlanta-San Francisco	17,519	N/A	42.63
300	Boston-Minneapolis	11,652	N/A	50.07
400	Charlotte-Wash., D.C.	9,178	N/A	55.34
500	Chicago-Raleigh/Durham, N.C.	7,271	N/A	59.55
600	Chicago-Wichita	6,099	N/A	63.00
700	Omaha-St. Louis	5,168	N/A	65.92
800	Detroit & Ann Arbor-Seattle/Tacoma	4,442	N/A	68.40
900	Las Vegas-San Antonio	3,907	N/A	70.55
1000	Los Angeles-Shreveport	3,335	N/A	72.42

Source: Nawal K. Teneja, The Commercial Airline Industry; Managerial Practices and Regulatory Policies. Lexington, Mass., Lexington Books, 1976, pp. 31-34.

V. FINANCIAL PERFORMANCE OF THE AIRLINES

A. Introduction

The airlines have an identified need for new, fuel efficient aircraft but current financial difficulties of most carriers preclude participation in significant re-equipment programs now. While the airlines require huge sums of money to finance their investment programs, they are experiencing difficult conditions in the face of a highly unpredictable operating environment. This section describes the financial history of the domestic airlines from 1968 to the end of the third quarter of 1981, especially as it affects their ability to finance new aircraft. The following topics are discussed:

- Profitability and earnings provide insight on the industry's operating structure and financial returns which affect the airlines' ability to finance new investment,
- Capital investment and the ability to pay evaluate the industry's investment activity relative to their ability to generate cash,
- Financial structure and solvency show how the airlines finance their assets and how well they are able to meet the costs associated with their debt,
- New developments in aircraft financing outline the traditional sources of external funding and the new instruments emerging as a result of heavy debt structures and changes in the tax law,
- The recent changes and proposed changes in the tax code have had a considerable impact on the airlines.
- The severe erosion of earnings and weakened balance sheets combined with a move to undermine the leasing provisions of the 1981 Economic Recovery Tax Act have caused some airlines to reconsider their fleet modernization programs. This part focuses on those airlines and their response to the threatening forces,

Finally, 1981 was a gloomy year for the airlines. Initial 1981 operating results are given showing the impact of a recession and flight cut-backs due to the PATCO action.

The analysis incorporates airline company data[1] obtained from the CAB Form 41 Reports for 1968 through the third quarter of 1981. Data were analyzed at the industry and carrier group level. Data were obtained through I.P. Sharp Associates, a vendor for CAB data, and are shown in Appendix IV-A. The data were analyzed using numerous measures, each of which is defined as used. Because the general measurement form is user defined and might vary somewhat from analyst to analyst, comparisons between these measures and those produced elsewhere, must be treated with considerable care or avoided.

The airline data are best interpreted when compared with data for other businesses operating in the same economic climate. Using the S&P 500,[2] an index of U.S. industrial, financial, and transportation corporations, a comparison of air carrier performance with other industries is made. S&P 500 data were obtained from Standard & Poor's Compustat Services for the period 1969-1981 and were defined to be consistent with those used for the carrier and carrier groups.[3]

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[1] Airline company data, as reported to the CAB, is not necessarily comparable to financial reporting data (e.g., SEC company annual reports) in that it follows CAB accounting guidelines, filed on a calendar fiscal year, and, in general, does not include non-airline operations or subsidiaries.

[2] Refer to Appendix IV-B for a description of the S&P 500 Index and listing of the companies currently included in the "500."

[3] See Appendix IV-C for a detailed discussion of individual airlines' financial performance.

B. Profitability and Earnings

A continuation of poor earnings by the airline industry could create serious problems for the industry to finance new equipment in the future. Historically, the industry could never be characterized as being highly profitable. High fixed operating costs and a high degree of financial leverage means that airline industry earnings are highly volatile. Airline earnings are vulnerable to those short-run factors which management cannot control, e.g., rising fuel prices, economic downturns, strikes, etc.

The industry's operating ratio[1] has always been high. From 1968 to 1981, it ranged from 0.936 to 1.007. Similarly, the industry's return on assets[2] during the same period has never exceeded 5.8 percent. The industry appears to be plagued by periods of severe overcapacity as profit margins (profits after taxes relative to sales) drop sharply with a concomitant drop in the return on assets (1968-70, 1974-75, 1978-81).

Figure 11 shows operating ratios over time for the industry, for major groupings within the industry, as well as the S&P 500[3]. While this ratio has been highly cyclical over time for the airline industry, it has risen sharply since 1978. Operating ratios for the S&P 500 remained relatively stable over the period at a significantly lower (better) level than the airlines.

While the operating ratio for the Majors closely mirrors that of the

---

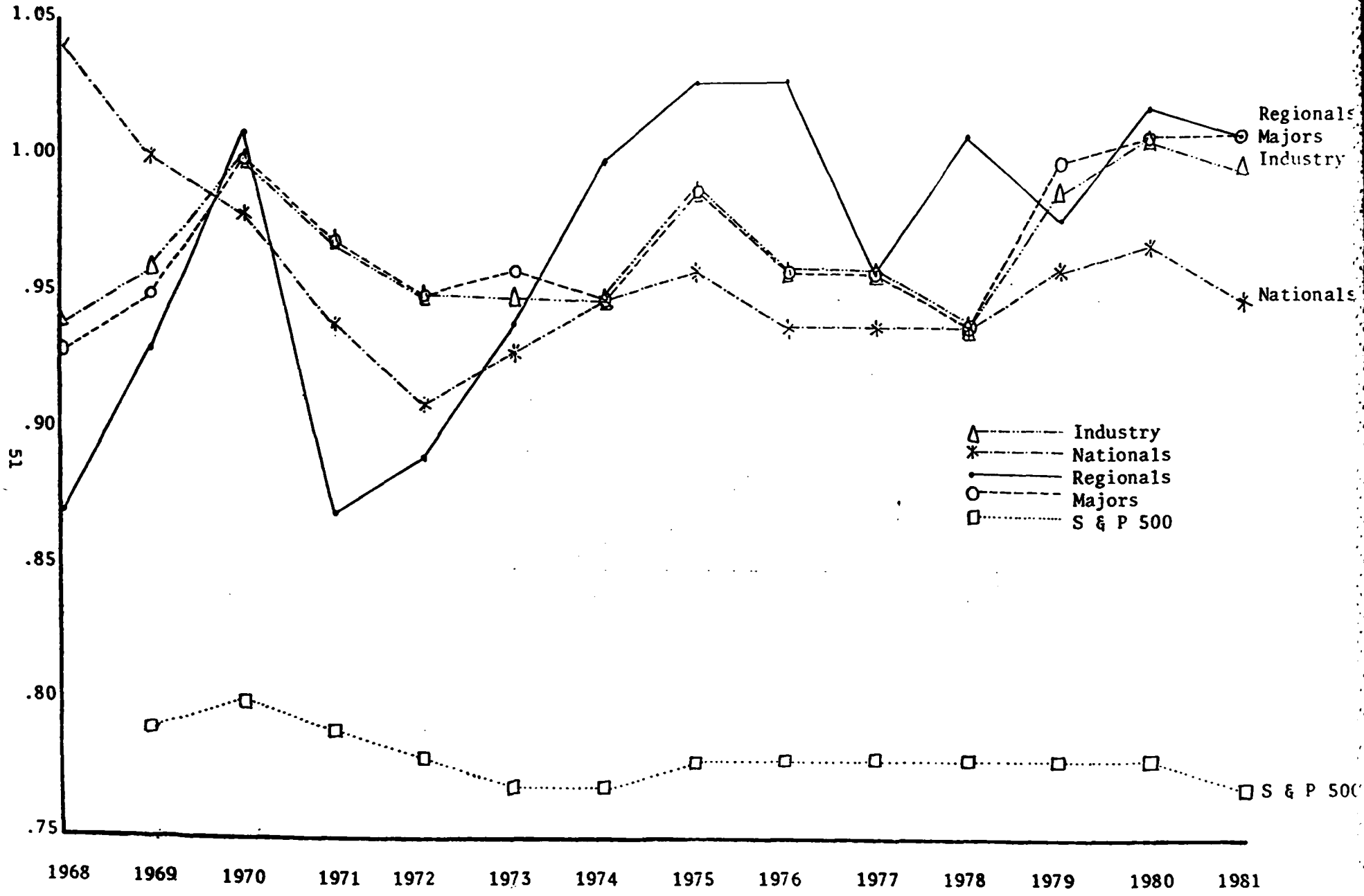
[1] Operating Ratio = Operating Expenses/Operating Revenues. This provides a measure of the proportion of revenues which may be used for interest expenses, taxes, and profits.

[2] Return on Assets = (Net Income/Total Assets) x 100

[3] The airline industry is subdivided by the CAB into classifications based on sales revenue. These are: Majors, Nationals, and Regionals.

FIGURE 11

Airline Industry Operating Ratio



Source: I.P. Sharp (Airline), Compustat (S&P 500)

industry, the operating ratio for the Nationals has been below the industry's since 1970. The operating ratio for Regional carriers has closely followed the industry in recent years. At present, all carrier groups, with the exception of the Nationals, have an operating loss, as shown by operating ratios in excess of one. This means that the revenue generated by passengers does not cover the costs of the flights, not even taking into account the overhead required to support flight operations. The effect of such non-operating items as interest, selling and administrative costs, and non-airline income and expense are not reflected in the operating ratio. Other businesses, as represented by the S&P 500, have been able to cover the cost of operations and contribute 21-23 percent of revenues to other business expense and, it is hoped, profits (as seen by an operating ratio of 77-79 percent).

Profitability does not necessarily result from high load factors. Table 6 shows load factors for the industry at their highest levels during 1978 to 1981. Nevertheless, operating ratios also reached their highest levels during this same period. Indeed, the correlation coefficient between the operating ratio and load factor is a low 0.168. Thus, the premise that high load factors mean profitability for the airlines is not necessarily true. Figure 12 shows that, although load factors have risen for the industry, profit margins have fallen sharply in recent years. (See Appendix IV-D.)

C. Capital Expenditures and the Ability to Pay

The process of investing in productive assets is the most basic activity of any business. The ability of the airlines to finance growth and replacement has traditionally been linked to allowable rates of return controlled by the CAB for regulatory purposes. Regardless of the quality of

Table 6

Airline Industry: Operating Statistics, 1968 to 1981

	S&P 500 Operating Ratio**	Operating Ratio*	Load Factor*	Revenue Passenger Miles (Billions)*	Available Seat Miles (Billions)*
1968	N/A	0.936	0.559	102.4	183.1
1969	0.79	0.958	0.528	143.5	271.8
1970	0.80	0.997	0.523	148.3	283.5
1971	0.79	0.967	0.505	149.3	295.6
1972	0.78	0.948	0.545	164.0	301.0
1973	0.77	0.954	0.536	174.4	325.1
1974	0.77	0.952	0.561	174.0	310.1
1975	0.78	0.990	0.549	173.3	315.6
1976	0.78	0.960	0.567	191.8	338.3
1977	0.78	0.955	0.571	206.1	361.2
1978	0.78	0.941	0.622	237.0	381.1
1979	0.78	0.993	0.633	268.5	423.9
1980	0.78	1.007	0.594	260.6	438.9
1981	0.77	1.003	0.588	253.7	431.7

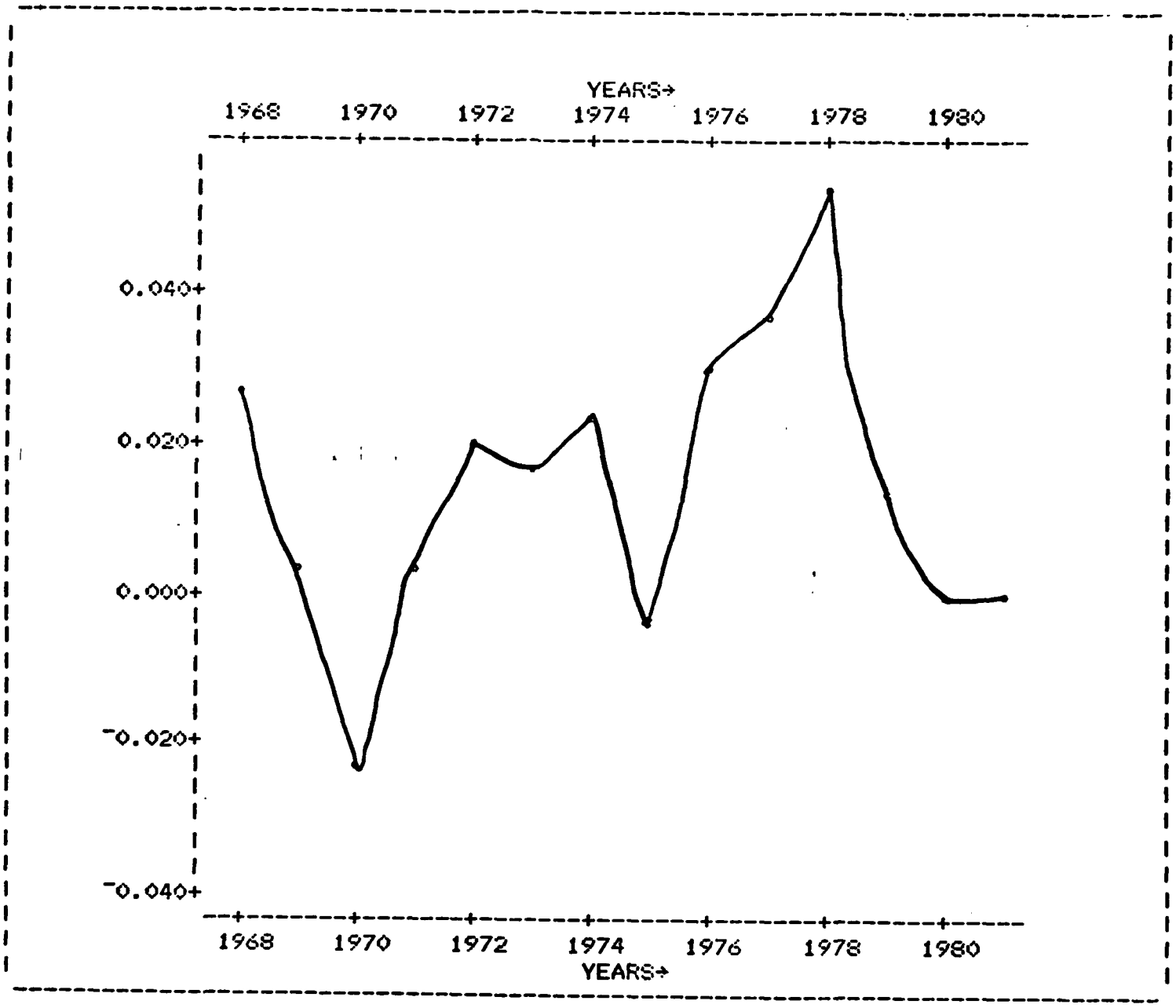
Correlation Coefficient of Operating Ratio -- Load Factor = 0.168, Airline Industry

* Source: I.P. Sharp

** Source: Compustat

FIGURE 12

Airline Industry: Profitability Measure, Profit Margin



Source: I.P. Sharp

the CAB rate-of-return measure, the airlines no longer face a price or market regulated environment. The potential stability in earnings and cash flows offered by regulation inclined creditors to accept higher debt levels than might otherwise be permissable. The loosening of the regulatory reins comes at a time when general economic pressures reveal the airlines' vulnerability to a business slowdown, high inflation, high capital costs, and reduced cash flows. It is at this time that the airlines are entering their new fuel-efficient equipment programs involving billions of dollars of capital investment. The conflicting aims of huge capital requirements and limited ability to pay illustrates a recurring problem for the industry: new equipment orders placed during a period of economic upturn are delivered during a downturn, straining the already unfavorable financial condition of the airlines.

The airlines' ability to support re-equipment programs is analyzed through the sources and uses of investment funds. The airlines generate a pool of funds to finance future growth. The size of that pool, in absolute dollars and relative to actual investment in assets, determines the rate at which the company can grow. That source includes funds generated from operations, specifically net income adjusted for non-cash expenses. The analysis is confined to the period 1975-1981 (1981 includes the first three quarters only), when sources and uses of funds data were available. Tables IV-E-1 to IV-E-5 of Appendix IV-E show detailed data by carrier group and the airline industry as a whole; Table IV-E-6 gives comparable data for the S&P 500.

Airlines are characterized by capital intensiveness. It is not surprising to see the wide variations between the market index and airline industry with respect to relative measures of capital investment. For the S&P 500, new

investment as a percentage of total assets is only about half of that for the airlines in the past five years. New investment expenditures have consistently been less than internally generated funds for the S&P 500, whereas airline investment expenditures have exceeded internally generated funds in every year but one since 1975. The airlines' shortfall in covering equipment expenditures from operations implies large infusions of other (external) sources of funds. This hypothesis is confirmed by the airlines' relatively low rate of contributions of funds from operations (internal sources) to total sources which have declined from nearly 50 percent in 1976 to about 30 percent in 1981. The S&P 500 showed internal source contribution rates generally declining from 70 percent to 63 percent in 1981. The airlines' inability since 1979 to generate operating funds is not seen in the market overall. The S&P 500 experienced a one percent decline in operating funds relative to total sources of funds[1] from 1978 to 1979, compared to the airline industry's drop of about 16 percent.

Airlines historically had been able to generate considerable cash. Starting in 1979, that ability has deteriorated, resulting in capital investment exceeding the capacity to generate internal funds. Table 7 shows the drop in operating funds after 1978 while total sources increased through 1980; long-term debt shows a significant increase in the 1978-1980 period.

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[1] Looking at the airlines by class of carrier, more distinctions arise. Regarding investment, the Majors set the trend for the industry. Generally, they showed a better ability to generate operating funds through the 1975-80 period (and probably 1981). The Regionals invested at the highest rate relative to their earnings. The Cargoes showed new investment which exceeded total investment in assets. Internally generated funds from operations could not cover these expenditure levels in five out of seven years. Nationals, Regionals and Cargoes generally required greater contributions from external sources of funds to finance investment than did the Majors. (See Appendix IV-E.)

Table 7

Sources of Funds -- Industry Total

SOURCE	1975	1976	1977	1978	1979	1980	1981
FUNDS FROM OPERATIONS	1,074	1,665	1,881	2,692	1,966	1,843	1,731
NEW LONG TERM DEBT	622	723	1,036	1,497	3,139	4,021	2,220
NEW EQUITY	9.14	9.98	297.04	149.27	109.62	256.90	264.69
TOTAL SOURCES OF FUNDS	3,067	3,342	4,027	5,990	6,675	8,122	5,434

SOURCE: SCH. B12
ONLY THE MAJOR ELEMENTS OF TOTAL SOURCES ARE SHOWN
1981 DATA INCLUDES QUARTERS 1 THROUGH 3 ONLY
DOLLARS IN MILLIONS

Source: I.P. Sharp, CAB Form 41

Over the 1976-1978 period, funds from operations supplied the industry with nearly 50 percent of the total sources of funds while new debt remained at relatively low levels, about 25 percent for the period. The increased profitability occuring in that period generated the higher level of internal funds available to finance investment (see Figure 13).

Looking at new investment relative to funds provided by operations,[1] some conclusions can be drawn about the interrelationships between profitability, internally generated funds, and investment. With the exception of the Regionals, all carrier groups were investing in equipment at relatively safe levels when compared to funds provided by operations (1976 through 1978). In Figure 14, the contrast between equipment investment and declining earnings begin to appear in 1978 when the investment to operating funds ratio shows an increase which extends through 1980; once again, the Regionals were the exception showing a decline in the 1978 through 1979 period which also influenced the direction of the industry's curve. By 1979-1980 all carrier groups were investing at a rate well above their earnings potential. As expected, new long-term debt shows a sharp rise between 1978 and 1980 upsetting the diminishing internal source of funds (see Figure 13).

By 1980, the airlines' poor performance is reflected in their equipment programs. A decline in the investment/operating funds ratio occurred largely as a result of the decline in investment; operating funds declined by only 5 percent as compared to a 45 percent drop in new debt and 33 percent drop in

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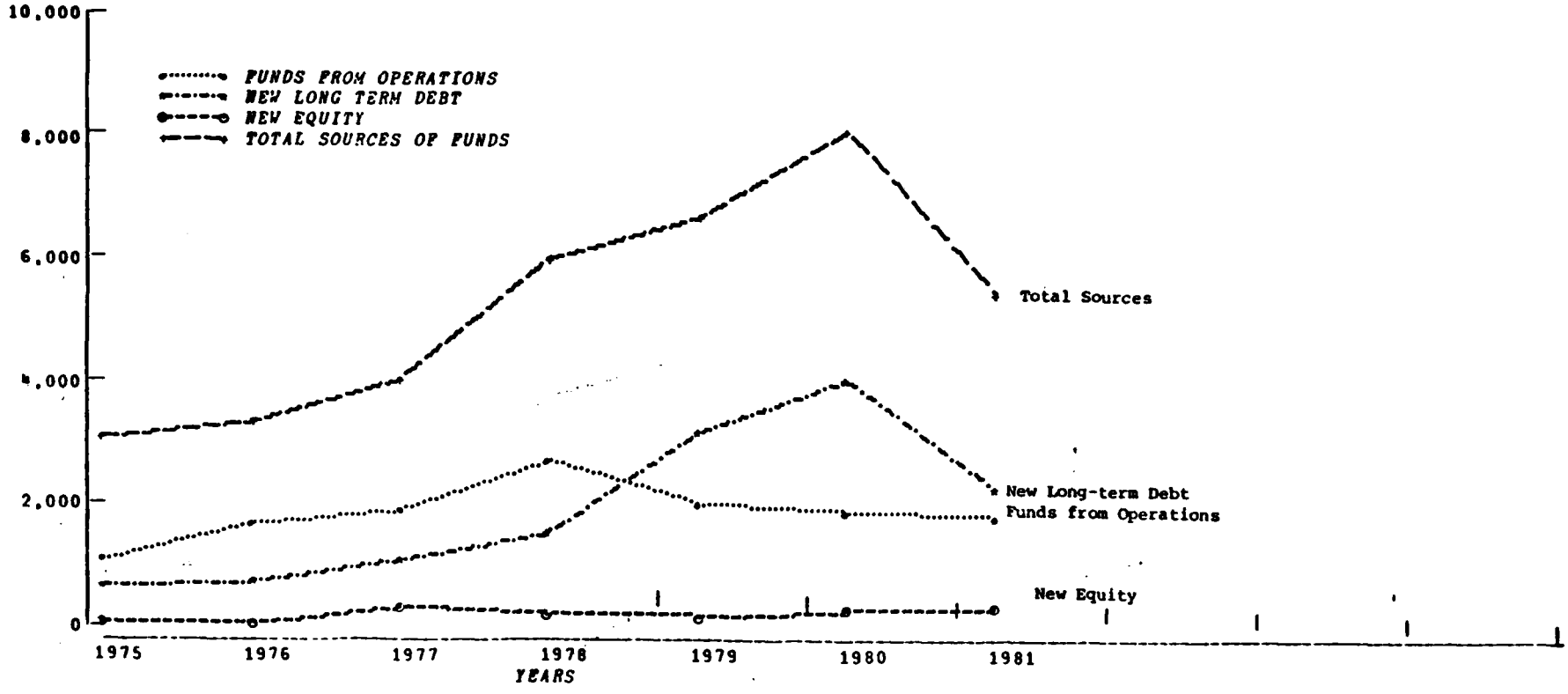
[1] When the ratio of new investment to funds from operations is 1.0 (100 percent), new investment is financed out of operating funds in total. A ratio of 2.0 (200 percent) indicates that for every $2 of capital expenditures, only $1 was provided by funds from operations; the other $1 was obtained from other sources, usually debt. A ratio of about 1.75 (175 percent) would be required to maintain a steady state debt ratio.

FIGURE 13

Sources of Funds -- Industry Total

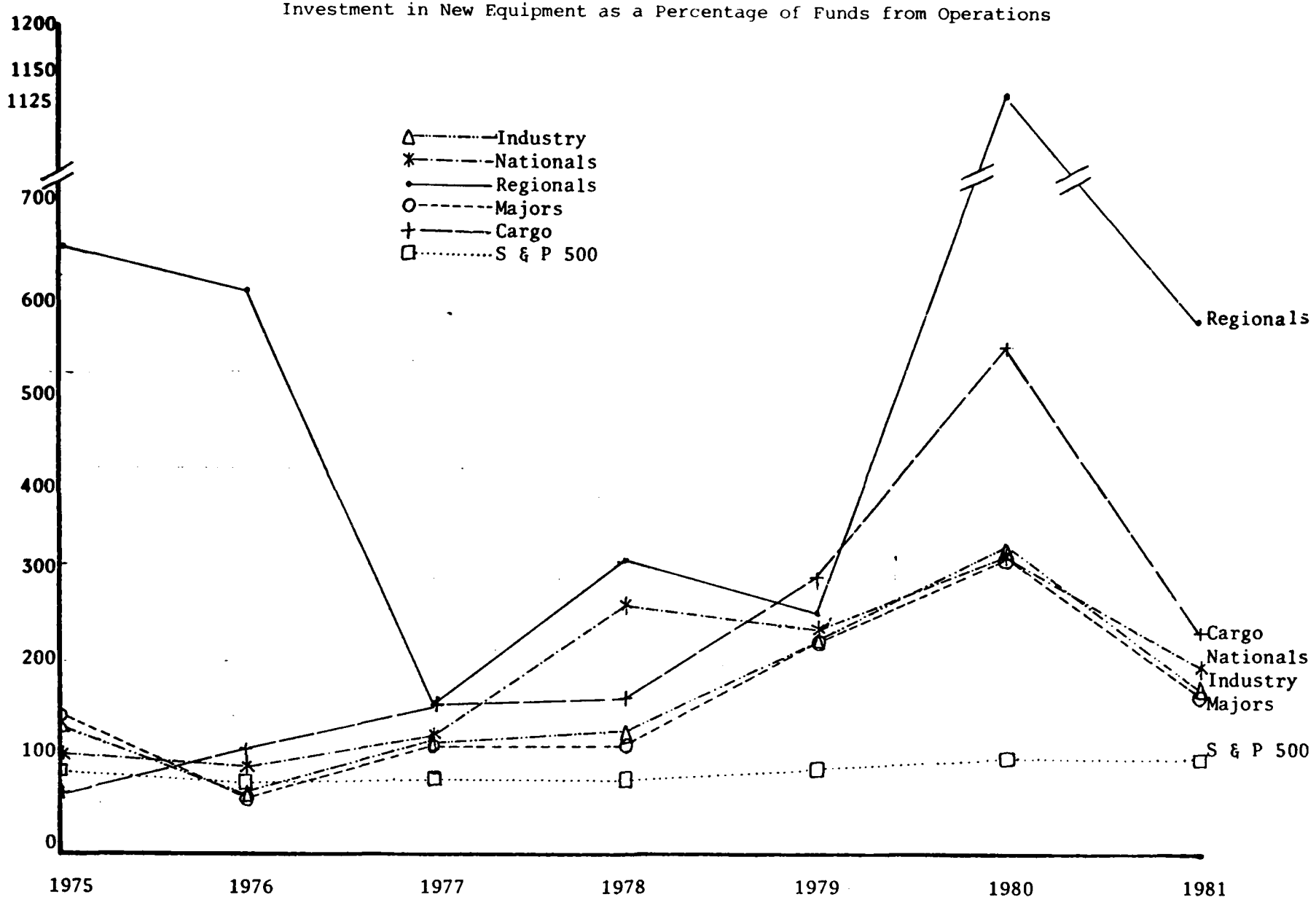


SOURCE: SCH, B12
ONLY THE MAJOR ELEMENTS OF TOTAL SOURCES ARE SHOWN
1981 DATA INCLUDES QUARTERS 1 THROUGH 3 ONLY
DOLLARS IN MILLIONS

Source: I.P. Sharp, CAB Form 41

FIGURE 14

Investment in New Equipment as a Percentage of Funds from Operations



1981 Data includes quarters 1 through 3 only, airline industry and carrier groups only.
Investment in new equipment: aquisition of new property and equipment
Funds from operations: net income plus non-cash charges

Source: I.P. Sharp, CAB Form 41 Data

total fund sources. The improvement in the ratio was not caused by improved profitability but investment programs more in line with the ability to generate earnings and cash flow.

In the final analysis, it appears that the airlines have invested in anticipation of growth that has not materialized. Recent investment trends far exceeded earnings performance and operating funds flows.

D. Financial Structure and Solvency

Financial structure describes the way in which an enterprise is financed, whether by creditors (through debt) or by owners. The debt/equity ratio measures the relative contributions of total debt to equity capital, indicating the degree of risk inherent in the firm's financial structure and the potential for volatility of earnings due to fixed interest charges. Generally, the higher the relative amount of debt in the firm's capital, the greater the volatility of net income and the higher the financial risk.

This ratio is also a measure of solvency, based on the premise that the larger the ratio of debt to equity, the lower the lenders' level of protection.[1] Debt/equity ratios for the S&P 500, airline industry and carrier groups are shown in Figure 15. The highly leveraged and very risky position of the airlines is seen in the debt/equity ratios in the range of 2-3, with some volatility experienced over the study period.[2] In contrast, the S&P 500 is somewhat lower, showing debt ranging from 1 1/2 to 2 1/4 times

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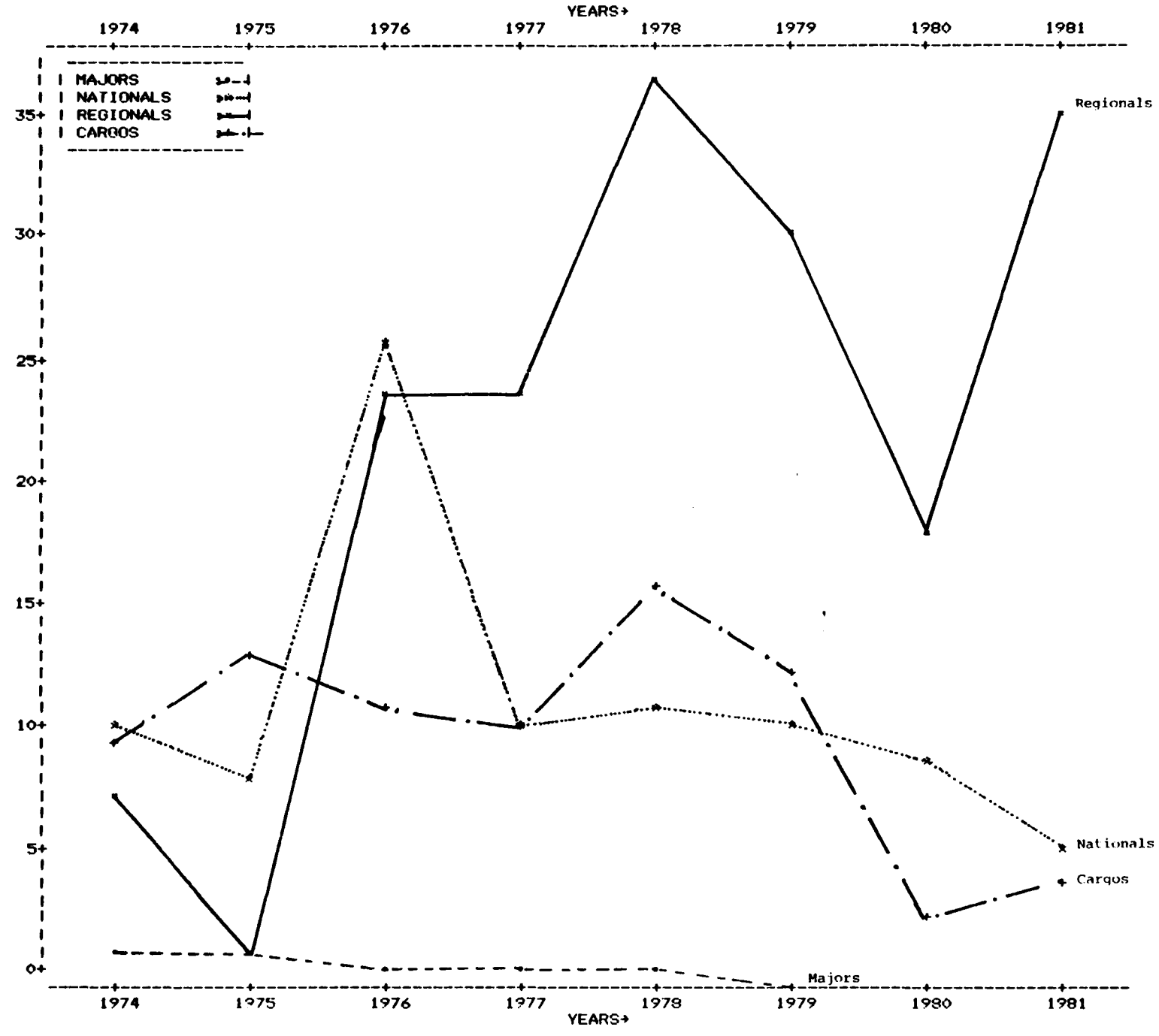
[1] This is a simplified approach which ignores possible increases in the book value of assets due to inflation and the distinction between differing degrees of debt protection (e.g., indenture agreements and mortgages).

[2] Additional detail on carrier group debt positions is contained in Appendix IV-F.

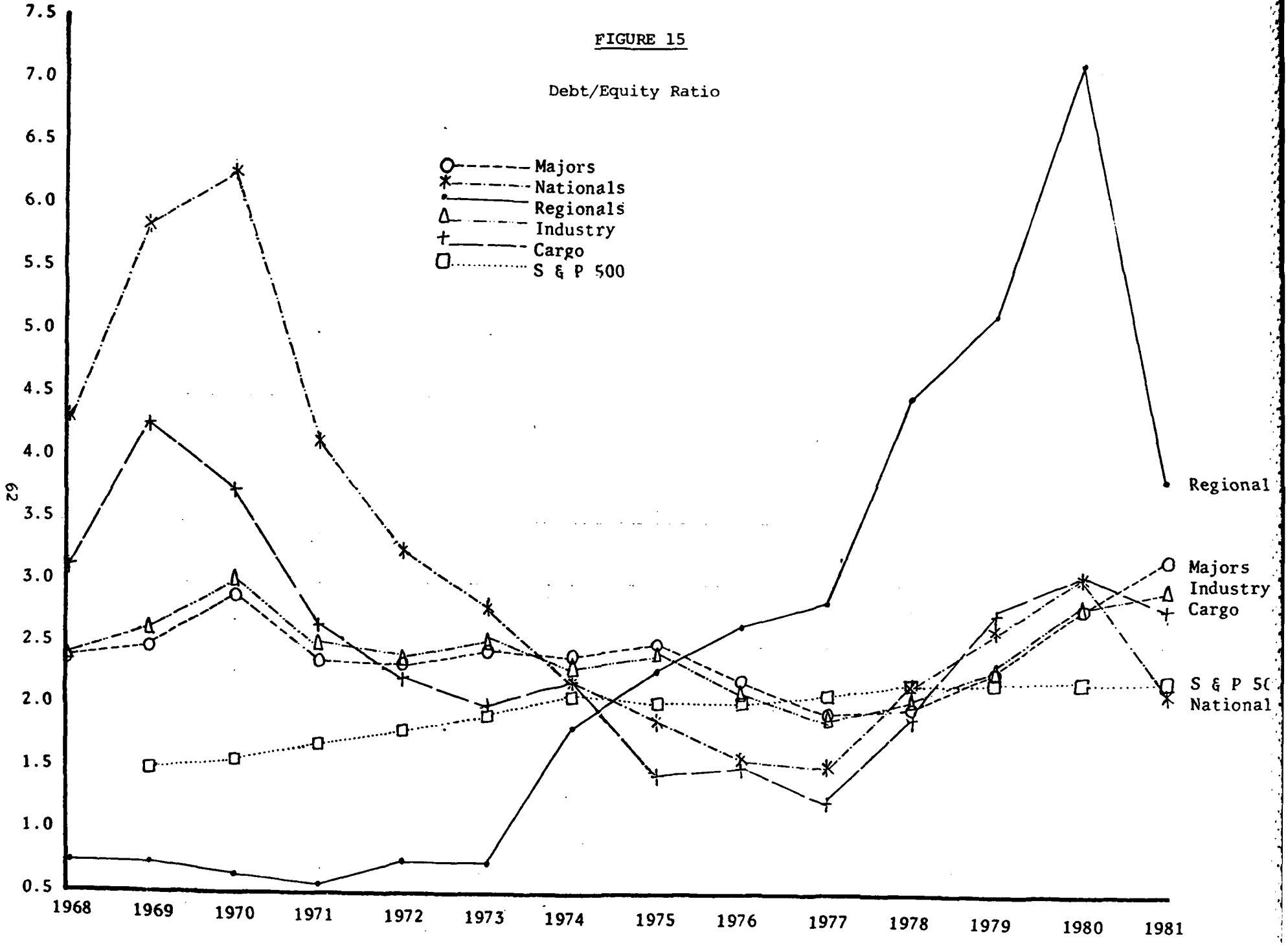
MAC OPERATIONS PERCENT OF TOTAL FUEL USE WITHIN CARRIER CLASS



SOURCE: I.P. SHARP

FIGURE 15

Debt/Equity Ratio



Source: I.P. Sharp (airlines), Compustat (S&P 500)

equity, and does not exhibit the wide swings shown by the airlines. In only one year, 1977, did the market ratio of debt to equity exceed the airline industry or the Majors. Over the period, airline debt dropped to a low of nearly two times equity in only 1977 and 1978.

Given such high levels of debt financing and so little apparent protection of lenders' capital, the question can be raised as to how the industry could continue to attract new debt funds. Though somewhat simplistic, the answer is largely based on the regulatory environment in which the airlines operated. The benefits of regulated markets and rate-of-return induced lenders to accept greater leverage in the airlines' balance sheet than they would in other non-regulated industries.

Lenders have traditionally financed equipment at a time when route structures were regulated because the lenders were guaranteed repayment. Route structures are no longer regulated and airlines no longer have to wait for an ailing carrier to go under to pick up new routes. Overcapacity now haunts the industry. The result is a weak market for used aircraft, and resale prices do not cover the outstanding debt on much equipment. The uncertainty in the airlines' business climate today is prompting lenders to require that carriers reduce their leveraged positions.

E. New Developments in Aircraft Financing

The airlines have traditionally financed re-equipment and expansion programs with a combination of internal funds and those generated externally, largely from insurance companies and commercial banks. The insurance companies generally provided long-term fixed rate loans while commercial banks provided medium and short-term floating rate loans. The securities markets raised both permanent capital, through the sale of common stock and debentures

convertible to stock, and long-term debt, through the sale of fixed rate bonds.

To meet capital needs in the 1980s, the airlines face changing capital markets no longer willing to supply fixed rate money for 15-18 year periods. The alternatives are that 1) the capital markets will be closed to many of the very risky, highly leveraged airlines, and 2) capital markets, when willing to participate in airline financing, will shorten the maturities of the securities and switch to floating from fixed rates. It is expected that the 12-15 year maturity will be the upper limits with most debt covering a seven to ten year (intermediate) maturity. Collateralized debt, specifically in the form of Equipment Trust Certificates[1] (ETC) is a concept now thought by many to be unattractive because the expected value of the aircraft supporting the debt has been unsatisfactory. Like other long-term instruments, the ETC looses its appeal as lenders seek to shorten debt maturities which are not long enough to cover the full life of a new aircraft. As a result, non-traditional sources of financing are emerging, including:

- European money markets (primarily Eurobonds)
- commercial paper
- manufacturer financing
- leasing

Eurobonds are public bond offerings in European markets, bearing fixed rates for intermediate terms. American Airlines was the first U.S. airline to enter the Euro market, securing $55 million in 1981 with an equipment trust offering; the bonds have a five-year maturity and will pay 15 1/4 percent.

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[1] Equipment Trust Certificates are a device used to finance the purchase of specific aircraft. Equipment obligations are issued by a trustee who holds title to the aircraft which is then leased to the airline. Like mortgage bonds, the lender has a specific lien on the aircraft.

The Eurobonds provided a portion of the intermediate term debt which more closely matched the life of the 10-year-old used 727 aircraft purchased from Braniff.

Though not Eurobonds, a new "double dipping" instrument is likely to emerge from Europe. American Airlines is working with two British banks for the purchase of aircraft which are then leased to an American firm which in turn leases the equipment to the airline. The foreign bank and non-airline U.S. firms receive tax benefits which lower the airline's effective leasing costs.

Only in the past few years have the money markets accepted airline commercial paper. These short-term notes, bearing fixed, prevailing rates of interest, are then continuously rolled over (with adjustments for market interest rates) taking on the characteristics of longer-term loans. A variation emerged in 1981, when United issued commercial paper against ticket receivables to provide some seasonal short-term financing. Commercial paper, while bearing a prevailing rate, is usually less costly than bank loans and can be tailored to the specific needs of the borrower and lender.

Airframe and engine manufacturers are increasing their financial assistance to airlines, which traditionally occurrs during efforts to launch new models. Manufacturer support can take a variety of forms in which the manufacturer acts as a lender, lessor, or guarantor. As a lender, the manufacturer delivers the aircraft to the airline upon receipt of a down payment with the balance paid in installments. As a lessor, the manufacturer retains title to the aircraft, while the airline makes periodic payments on the equipment. As a guarantor, the manufacturer takes back a loan the airline placed with an outside source, but the "guarantee" can allow the airline

access to new cheaper capital. Domestic manufacturers, to compete with their foreign counterparts who receive support from their governments and export banks, have offered, as a last resort, financing support themselves or through their financing subsidiaries.

Although aircraft financing packages are increasing in variety, the capital made available through these instruments will be limited until the airlines' financial performance improves. This is critical in view of the recent restrictions in safe-harbor leasing incorporated in the Tax Equity and Fiscal Responsibility Act of 1982.

F. Changes in Tax Policy and Lease Arrangements

The Economic Recovery Tax Act of 1981 (ERTA) provided two major new methods for improving cash flows for equipment financing: safe-harbor leasing and the Accelerated Cost Recovery System (ACRS). The Tax Equity and Fiscal Responsibility Act of 1982 significantly changed these and other tax rules, although aircraft received some relief in the transitional rules.

ERTA introduced a mechanism for the transfer of tax benefits arising from investment in new equipment, frequently referred to as safe-harbor leases. The intent of the leasing provision is to assure that tax benefits, in the form of accelerated depreciation (ACRS) or investment tax credits (ITC), or both, would be available even to those firms who had little or no tax liability and thus could not benefit from tax credits or reductions except through merger. By selling tax benefits for cash, the effective cost of financing is lowered, and the investment incentives of the ACRS and ITC are achieved.

The leasing provisions provided a new method to improve cash flows for financing equipment. The original safe-harbor rules allowed the airlines to

sell its new equipment to a third party, generally receiving 20-30 percent of the purchase price in cash and a note for the balance. The buyer receives the investment tax credits and depreciation while leasing the equipment to the seller (i.e., airline) for an amount equal to the note.

Major provisions included in the Tax Equity and Fiscal Responsibility Act of 1982 changed safe-harbor leasing by: placing limitations on the application of lessee and lessor safe-harbor transactions; repealing safe-harbor lease provisions for leases entered into after December 31, 1983; and scaling back the recovery method or ACRS. The modifications generally apply to those safe-harbor leases entered into after July 1, 1982.

The modifications to safe-harbor leases do not apply to commercial passenger aircraft placed in service before January 1, 1984 if after June 25, 1981 and before February 20, 1982 either (1) the aircraft was acquired by the lessee or construction begun for the lessee, or (2) a binding contract to acquire or construct the aircraft was entered into by the lessee. If either of these two conditions are met, the more generous safe-harbor rules of ERTA apply, as long as the aircraft will be placed in service before January 1, 1984. If either of these conditions are not met, then the more restrictive safe-harbor leasing rules of the 1982 act apply. Furthermore, leases entered into after December 31, 1983 will not be able to take advantage of the safe-harbor leasing prescribed either in the old law or the new law.

Safe-harbor leasing had a significant impact on U.S. airlines' 1981 financial performance. Pan Am, one of the struggling airlines, was able to take advantage of the tax bill in 1981 but others, such as Braniff, were not because of a hitch in the rule: if the user (seller of tax benefits) of the equipment fails, the buyer of the tax benefits loses whatever benefits have

already been taken. Several profitable airlines, including Delta, Southwest, and Northwest, were unwilling to sell their tax benefits in 1981 because they needed to offset tax liabilities of their own.

To put the tax benefit transfers in perspective, it is helpful to note that the airlines had accumulated unused investment tax credits estimated at $650 million at the end of 1980; annual depreciation writeoffs were estimated to be nearly $2 billion for the industry. Actual gains from the sale of tax benefits in 1981 were estimated to be over $200 million. Ten of the Majors posted a total gain over $200 million from tax benefit transfers but still reported a net loss of $115.4 million for 1981, as seen in Table 9 below.

Table 8

Selected Major Airlines
1981 Net Income and Tax Benefits
(Millions of Dollars)

	1981 Net	Gain From Sale of Tax Benefits (Leasing)
American	$ +47.4	$ 13.9
Continental	-60.4	23.4
Delta	+91.6	
Eastern	-65.9	29.8
Republic	-46.3	28.9
Pan American	-18.8	82.2
Trans World	-25.1	
United	-70.5	11.5
US Air	+51.1	8.4
Western	-73.4	5.5
TOTAL	$ -115.4	$203.6

The longer-term effects of the capital infusion from safe-harbor leasing could be important, especially to airlines such as United that ordered a large number of new-generation aircraft. The industry has ordered or optioned billions of dollars worth of new aircraft both current-production and

new-production equipment. Because of the highly leveraged position of the airlines, it is extremely difficult to obtain substantial debt or equity financing despite the continuing need to upgrade equipment. Though orders and options were placed prior to the 1981 Act, the fulfillment of the investment program largely appears to be linked to the leasing provisions because of the unforeseen downturn in the economy and the airline industry since 1978. Although restructuring of the programs might have occurred in 1981, the introduction of safe harbor leasing made it possible for many of the airlines to continue their orders despite current performance and narrowing financing alternatives.

G. Re-evaluation of New Equipment Programs

New equipment programs launched in the late 1970s focused on Boeing's new technology, fuel-efficient 757 and 767 aircraft. The 757s are narrow-body, twin-engine planes designed for short- to medium-range operations; the 767s are wide-body twin engine craft. When Boeing introduced the aircraft, the airline industry was achieving a satisfactory profit level. Since then, two successive recessions, inflation, high interest rates, sustained record losses and the move to repeal the leasing provisions of the ERTA are forcing the airlines to reconsider their orders and options.

- American Airlines announced in February, 1982, that it cancelled orders for fifteen 757 airliners valued at about $600 million. It also cancelled options for an additional fifteen 757s. Their commitment to buy thirty of the larger 767 aircraft may be stretched out over time.

- Eastern Airlines, as represented by its Chairman speaking before the Senate Finance Committee on March 18, 1982, said that the early repeal of the 1981 Tax Act's leasing provisions would put into question its nearly $1 billion equipment program which includes orders for 21 757s and options for another 27. The industry would be forced to

reconsider its fleet modernization program involving 400 aircraft on order or option with a value in excess of $15 billion.

- United Airlines told Boeing in late March to stop work on 20 767 jets until Congress comes to a decision on changing the leasing provisions of the 1981 Tax Act. United originally ordered 39 of the new aircraft and had options on an additional 30. The estimated value of the cancellation is at least $800 million.

The airlines' operations could be severely affected by the cancellations. The new technology aircraft are designed to impart operating costs. The 757s and 767s are nearly 35 percent more fuel efficient than older aircraft. The airlines also hoped that travelers would be attracted to the new look of the planes.

Boeing would also suffer from the cancellations. The recession has already taken its toll on Boeing, which showed a 42 percent drop in profits in the fourth quarter of 1981 from last year's fourth quarter. In addition, Boeing was one of the larger Braniff creditors. Braniff ordered three 747s which Boeing manufactured but had not delivered, totalling $84 million.

Lockheed's phase out of production of the L-1011 TriStar has been pushed up to 1983 due to the apparent cancellation of purchase options by foreign and domestic airlines. Of the 40 options for the jumbo jets, TWA publicly announced its cancellation of nine options. Once again, the slump in international air travel and the availability of used aircraft are attributed to the cancellations. Lockheed began taking write-downs on the TriStar program last year ($396 million) when it began the phase-out. The phase-out of the L-1011 not only will strengthen Lockheed's financial position, but will also move it out of civil aviation manufacturing.

VI. CONCLUSIONS

A. Analysis of Interrelationships Between Operating and Financial Characteristics

Developments in three general classes of interrelationships between operating and financial conditions of the U.S. civil airline industry largely determine the industry's current and future position. These areas are:

1. General U.S. economic conditions
2. The deregulatory environment and its effect on competition
3. Fuel prices.

The industry's current turbulence has caused the airlines to shorten their planning horizons to coincide with external influences, internal operations, and the speed of change of various factors affecting the overall industry. The interrelationships between the industry's various structural, behavioral and performance characteristics are complex and subject to change over time. However, focusing on existing conditions, current trends, and near-term expectations, it is possible to describe the major components and their interrelationships.

General Economic Conditions

One major influence on the operating and financial condition of the U.S. airline industry at any point in time is the prevailing condition of the general economy. Airlines are more sensitive than many other firms to general economic trends, growing fast during upswings while suffering in a declining economy. This is due to the non-essential nature of much air traffic. For example, during a recession businesses cut back on travel, vacationers fly less, and freight shipments decline.

General financial conditions also impact the airlines. When interest

rates are high, capital to finance expansion is more difficult to obtain and is more costly than during periods of more sustained growth and lower interest rates. Financial institutions are less willing to arrange capital expansion for airlines during periods of declining economic activity. Thus, one factor which is very important to the renewed operating and financial strength of the U.S. airline industry is the general condition of the economy.

Deregulation

A second factor affecting the U.S. airline industry is the major change resulting from deregulation. During the long period of airline regulation, the industry structure had been relatively stable and there was a clear understanding of these "rules of the game." However, since deregulation, apparent structural changes include the movement to larger markets by the major and national airlines, the movement of large regional airlines into longer-haul markets, and the development of the hub and spoke network. The hub and spoke network of route competition allows the airlines to move larger numbers of people at less cost per person. Although it brings some inconvenience, the potential for reducing costs, increasing load factors, and reducing the number of unprofitable routes should improve airlines' conditions. It seems likely that the hub and spoke network will continue to grow and become a major logistics feature of the future U.S. airline industry.

The deregulated environment, combined with a depressed economy, has resulted in intense fare competition between airlines, even to the point where average fares do not cover operating costs and individual airlines incur losses, as most did in 1981. This type of "frictional" adjustment, that is, changes in the structure of the market adapting to a new deregulated environment, has certainly had impacts on individual airlines but in general

should not affect the total level of air travel (capacity) in the airline industry.

The overall volume of service provided by the airline industry will closely follow general trends in the economy, although as individual airlines jockey for position in different markets, there may be a change in the participants within the industry. Inefficient airlines will be less able to compete in the new deregulated market; they will have to radically change their operating structure or exit the industry, while more efficient carriers will thrive. After the adjustments to deregulation have been made, the airline industry should emerge as a stronger and more viable component of the transportation sector. The structure, in terms of number and size distribution of airlines in different carrier classes, may be different and is difficult to predict, but the result should be more efficient passenger and cargo service.

One major ingredient in the new competitive environment is the relationship between travel agents and the airlines. They write approximately 60 percent of all air travel tickets. With so large a share of total tickets, travel agents acting collectively could influence the health of a specific airline (for example, a joint decision to avoid or embargo an airline could push that airline toward bankruptcy).

Travel agents' effectiveness in dealing with a specific airline is determined largely by the relative speed of diffusion of information and how individual agents act on that information. The structure of the travel agent industry is sufficiently diffuse that the likelihood of agencies acting collectively is small. However, the fact that travel agents are not cohesive does not in itself preclude influence -- agents have relatively few

information sources, particularly dependent upon the large data bases provided by a few individual airlines. Given the current structure of information processing, it is possible that agents could, either coincidentally or by design, affect an individual airline's position in the industry. Currently, airlines are recognizing the increasing importance of travel agents and are examining their relationships with travel agents, in a deregulated, competitive environment.

Fuel Prices

The third major factor affecting the airline industry is the dramatic increase in fuel prices begun in late 1973, and the impact of higher prices on technological development within the industry. Fuel costs now represent over 30 percent of total operating expense, a 2 1/2 fold increase from approximately the 12 percent level which prevailed in the 1960s and early 1970s. This has spurred the development of new, more fuel-efficient aircraft such as the Boeing 757 and 767. Airlines have attempted to purchase new, fuel-efficient aircraft and have structured their routes to better utilize their aircraft and reduce total fuel cost.

Impact on Expansion in the Industry

The current financial condition of the industry in general and most of the airlines is at best tenuous. Braniff has gone bankrupt, and several others are experiencing deteriorating financial positions. The changes in the airline industry's financial structure seriously affect their ability to acquire (finance) new equipment. Leasing has recently become a more important if not necessary means by which many airlines acquire new capital equipment. Various leasing arrangements have been used, some of which are relatively

straightforward. However, as the complexity of financing new equipment has increased, so has the intricacy of lease arrangements, many now spanning international borders and involving various governments. Domestic actions such as support of the Export-Import Bank policies and safe-harbor leasing have recently had a large impact on airlines' ability to finance new equipment. However, in spite of these conditions the poor operating performance of the industry and the subsequent poor financial performance has caused many airlines to postpone new equipment on order (as well as options) and to keep older, less efficient aircraft in service for a longer period of time than they would have under an environment where some guarantee about yields could be expected. This has had an impact also on the market for used aircraft and has initiated refurbishing of existing fleets.

Outlook for the Future

The changes that the U.S. airlines are undergoing are new in the history of the airline industry. These changes in the structure, operating behavior and financial positions of airlines, while severe in some cases, are likely to be temporary and greatly dependent upon general economic conditions. It was widely accepted that deregulation would intensify competition, both in terms of route structure and fares. However, it could not be forecast that the transition to deregulation would occur during generally weak economic times and consequently poor demand for air service. These events, along with increasing fuel prices, have weakened the airlines.

From an operational perspective, the airline industry is changing dramatically, from one that stressed passenger convenience (in a regulated environment) to operating efficiency and cost reductions reflected in development of the hub and spoke network of air travel.

It seems clear that the conditions currently being felt throughout the airline industry are not what many experts consider to be normal. The industry has not fully adjusted to its new operating enviroment. While current conditions in the airline industry are more severe than they have been in decades, there have been other instances in the past when sectors within the industry have had to deal with great uncertainty. For example, the introduction of new aircraft types has always caused great uncertainty, not only on the part of manufacturers, but for those airlines that chose to purchase that aircraft (the introduction of wide body aircraft in the late 1960s is a prime example of the enormous impacts and swings that can occur within the industry). If there is anything to learn from historical consequences in the airline industry, it is that the industry is resilient to negative influences, has the ability to adjust, reevaluate its position, and change. That flexibility may be the saving grace for individual airlines. It seems likely that the industry will prosper in the future. Individual firms in the industry will adjust, both in their operating and financial behavior, in order to survive, and the total level of air service provided to the public will not significantly change, meeting the demands of travelers. However, in the long run, a stronger industry will emerge, one that is more efficient, and better able to deal with future operating and financial challenges.

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